BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. 24. Lancaster, Pa., August 29, 1897. No. 8.

Revisio Lobeliacearum Boliviensium hucusque cognitarum.

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1. CENTROPOGON YUNGASENSIS Britt. Bull. Torr. Bot. Club, **19**: 371. 1892.

Yungas, 4,000 ft. (Rusby, Pl. Boliv., no. 642!)

A *C. gracili* Drake del Cass. in Journ. de Botan. **3**: 238, 1889, et a *C. nutante* Planch. et Oerst. in Vidensk. Meddel. naturh. foren. Kjobenhavn, **1857**: 156, A. Zahlbr. in Annal. k. k. naturhist. Hofmus. Wien, **6**: 438, 1891, differt foliis glabris obtusis, lobis calycinis patentibus et corolla glabra.

2. CENTROPOGON AMPLIFOLIUS Vatke, Linnaea, **38**: 716. 1874. A. Zahlbr. in Annal. k. k. naturhist. Hofmus. Wien, **6**: 434. 1891.

f. lobis calycinis paulum brevioribus et angustioribus.

Santa Rosa, l. O. Kuntze (April—flor. Exemplum incompletum.)

3. CENTROPOGON BANGI A. Zahlbr. n. sp. Syn. *C. Surinamensis* Britt. Bull. Torr. Bot. Club, **19**: 371. 1892 (quoad no. 1093).

Herbacea, caules subrecti, virides, in partibus junioribus hirti, demum calvescentes et scabriusculi. Folia alternantia, suberecta, ovata vel ovato-oblonga, in petiolum brevem sensim attenuata, apice breviter acuminata et plerumque brevissimme mucronutata, membranacea, in margine inaequaliter calloso-denticulata; lamina supra viridis opacusque, hirta et scabrida, subtus pallidior, glaucescens, breviter (adnervaturam densius) hirta; 11–22 cm. longa (inclus. petiolo) et 4–6 cm. lata; costa crassiuscula, subtus prominens et albidus, nervi laterales 8–9, patenti-adscendentes. Inflorescentia terminalis, corymbosa, pauci-(5–10-)flora, foliis caulinis superioribus multo (circa ¼) brevior; bracteae oblonga, hirtae, in margine denticulata; pedunculi tenuies, 22–24 mm. longi, bracteis paulum breviores, hirti. Receptaculum subglobosum, 10-costatum; lobi calycini anguste triangulares, acuminata, viridis, in margine integri, 5–6 mm. longi et basi 3 mm. lati, sinubus acutis. Corolla kermesina, 22–24 mm. longa, e basi parum inflata versus limbum sensim ampliata, limbo inflato, circ. 1 mm. in diam., limbi lobi triangulari-cuspidati, falcati, 2 posteriores latiores. Staminum tubus glaber, fere tubo corollae adnatus, sub antheri parum exsertus; antherarum tubus basi et dorso parum pubescens; antherarum 2 minores vertice appendice fere cartilaginea alba coronata. Stigma bilobum, lobis late ovatis obtusisque. Bacca viridis (?), globosa, circ. 1 cm. in diam.; semina numerosissima, anguloso-ovoidea, ad 0.5 mm. longa flavido-brunnea, laevia.

Yungas, 4000 ft. (Bang, Pl. Boliv. no. 500! et Rusby, Pl. Boliv. no. 1093!)

A proximo *C. amplifolio* Vatke differt foliis minoribus eorumque indumento et praesatim lobis calycinis tubi corollae dimidium haud aequantibus; a *C. gesneraeformi* Drake del Cast. in Journ. de Botan. **3**: 239, 1889, corolla aliter formata.

4. CENTROPOGON MANDONIS A. Zahlbr. in Annal k. k. naturhist. Hofmus. Wien, **6**: 438. 1891.

Viciniis Sorata, Gueliguaya, in nemoribus, 2700–2800 mt. s. m.

(Mandon, Fl. Andium Boliv. no. 494!), prope Yungas (Bang, Pl. Boliv. no. 738 et 738a! sub *Siphocampylo giganteo* var. *latifolio* Britt.

5. Centropogon Brittonianus A. Zahlbr. n. sp.

Syn. *Siphocampylus giganteus* var. *latifolius* Britt. Bull. Torr. Bot. Club, **19**: 373. 1892. Non Vatke.

Fruticosa (?). Caules validi, subsulcati, in partibus junioribus grisco-tomentelli. Folia alternantia, suberecta, petiolata, oblongo-lanceolata, apice acutata, basi parum inaequali et in petiolum decurrentia, membranacea, in margine minute denticulata, supra obscuriora, laevia, opaca, subtus imprimis ad nervaturam brunnescentem et in juventute breviter adpresse pilosa (pilis crassiusculis ramosisque), inclus. petiolo 18–20 cm. longa et 5–6.5 cm. lata; nervi secundarii, 20–24, reticulatim connexi. Pedunculi axillares solitarii, suberecti, foliis breviores, 16–18 cm. longi, compressiusculi et tomentelli, supra basim bracteolis 2 filiformibus, 8–10 mm. longis muniti. Flores magni, post anthesin nutantes. Receptaculum subhemisphaericum vel oblongum, griseo-tomentellum, 10-nervum, 12–15 mm. in diam.; lobi calycini e sinubus rotundatis, sat latis assurgentes, lineares, utrinque in margine dentibus 5 obtusis callosisque obsita, tubo corollae longiores, 26–30 mm. longi et circ. 3 mm. lati. Corolla rubra extus tomentella, intus glabra; tubus corollae brevis, amplus, fere rectus, 22–24 mm. longus et 11–13 mm. in diam.; lobi corollae parum inaequales parum falcati. Staminum tubus sub anthesi longe exsertus, 55–60 mm. longus, crassiusculus et pilosus; antherarum tubus undique dense et longe fulvescenti-setulosus. Bacca corollae laciniis haud auctis coronata, circ. 20 mm. in diam., subtomentella; semina minuta, ovoidea, brunneo-lutescentia, laeves, vix 1 mm. longa.

Unduavi (Rusby, Pl. Boliv. no. 638!)

A priori differt indumento, foliis majoribus, petiolis subalatis et lobis calycinis aliter formatis.

6. Centropogon Surinamensis Presl, Prodr. Monogr. Lobel. 48. 1836; Kanitz apud Martius, Flor. Brasil. **6**: Pars 4, 134, *tab. 39*. 1878; Britt. Bull. Torr. Bot. Club, **19**: 371. 1892.

Mapiri, 2500 ft. (Rusby, Pl. Boliv. no. 635!), La Rosa, 2000 mt. April–flor. l. O. Kuntze!

7. Centropogon gloriosus (Britt.) A. Zahlbr.

Syn.: *Siphocampylus gloriosus* Britt. Bull. Torr. Bot. Club, **19**: 373. 1892.

Unduavi, 8000 ft. (Rusby, Pl. Boliv. no. 647!)

Planta ob baccam ad genus *Centropogon* referenda. Bacca globosa, circ. 2 cm. in diam., 10-nerva, ferrugineo-tomentosa, lobis calycinis coronata. Species distincta et pulchra. *P. Mandonis* A. Zahlbr. affinis.

8. Centropogon Unduavensis (Britt.) A. Zahlbr.

Syn.: *Siphocampylus Unduavensis* Britt. Bull. Torr. Bot. Club, **19**: 373. 1892.

Unduavi, 8000 ft. Octbr.–flor. (Rusby, Pl. Boliv. no. 649!)

Ex affinitate *C. barbatae* Planch. in Flore des Serres **6**: 16. 1850 (*Lobelia barbata* Cavan. Icon. et Descript. Plant. **6**: 12, *tab. 519.* 1801.) corolla brevi et lobis calycinis distincta.

9. Centropogon (?) incanus (Britt.) A. Zahlbr.

Siphocampylus incanus Britt. Bull. Torr. Bot. Club, **19**: 373. 1892.

Ad hoc genus pertinere videtur, fructus attamen ignotus. A *Siphocampylo Dombeyano* A. DC. apud DC. Prodr. **7**: Pars 2, 406. 1839, cui valde affinis, differt foliis majoribus obovatis, basi angustatis.

Odore foetido (Bang in sched.)

Yungas, 6000 ft. (Rusby Pl. Boliv. no. 648!) Corvico prope Yungas; Sptbr.–flor. [Bang, Pl. Boliv. no. 2474.]

II. Siphocampylus Pohl.

1. Folia verticellata, ternata. *S. Orbignianus.*
   Folia alterna 2
2. Tubus corollae amplus lobis calycinis brevior vel subaequalis 3
   Tubus corollae lobis calycinis multo (1–6–∞) longior. 4
3. Folia subsessilia, pedicelli foliis breviores, antherarum tubus lanatus. *S. radiatus.*
   Folia petiolata, pedicelli foliis multo longiores, antherarum tubus glaber. *S. Rusbyanus.*
4. Inflorescentia terminalis, racemosa vel corymboso-conferta. 5
   Flores axillares, solitarii 9
5. Plantae erectae 6
   Plantae scandentes 7
6. Inflorescentia racemosa, elongata, caules crassiusculi, folia ovato-lineares. *S. tupaeformis.*
   Inflorescentia corymbosa, caules graciles, folia, late ovata. *S. corymbiferus.*

7. Calycis tubus extus glaber; folia falcata, conduplicata. *S. angustiflorus.*
Calycis tubus extus pubescens vel pulverulentus; folia plana 8
8. Calycis lobi receptaculo duplo circa longiores, folia obovato-linearia. *S. oblongifolius.*
Calycis lobi receptaculo breviores, folia ovato-oblonga. *S. flagelliformis.*
9. Plantae erectae 10
Plantae scandentes 17
10. Tubus corollae amplus lobis corollinis brevior 11
Tubus corollae elongatus lobis corollinis multo longior. 12
11. Lobi calycini receptaculo depresso-turbinato breviores. *S. Tunarensis.*
Lobi calycini receptaculo obconico duplo circa longiores. *S. Vatkeanus.*
12. Folia basi cordata. 13
Folia basi angustata. 14
13. Folia rigida, subtus pilosiuscula, nervatura prominula. *S. bilabiatus.*
Folia tenuia, subtus glaberrima, nervatura non prominens. *S. argutus.*
14. Flores lutei. 15
Flores kermesini vel rubri 16
15. Corollae tubus fauce manifeste constrictus, tubus staminum sub anthesin tubo corollae longe exsertus. *S. Kuntzeanus.*
Corollae tubus fauce non constricta, tubus staminum sub anthesin tubo corollae inclusus. *S. aureus.*
16. Caules graciles, folia ovata, calycis lobi receptaculo longiores, arguta dentata. *S. dubius.*
Caules crassi, folia oblongo-linearia, calycis lobi receptaculo vix longiores, integri. *S. Boliviensis.*
17. Folia internodiis haud vel parum longioria, reflexa. *S. corrioides.*
Folia internodiis multo longioribus, erecta vel suberecta 18
18. Lobi calycis in margine integri. *S. Andinus.*
Lobi calycini utrinque dentibus 3–4 glandulosis muniti. *S. elegans.*

1. Siphocamypylus Orbignianus A. DC. apud DC. Prodr. **7**: Pars 2, 2405. 1839. Planch. in Flore des Serres, **6**: 15, *tab. 544*, 1850–51. Botanic. Mag. **79**: *tab. 4713*. 1853.
Syn: *Siphocampylus volubilis* Britt. Bull. Torr. Bot. Club, **19**: 372, 1892, et Mem. Torr. Bot. Club, **6**: 72. 1896. Non G. Don.

In Bolivia late distributa videtur. Chuluma Ya [Orbigny no. 469! Hb. Paris]; provincia Yungas, in fruticetis humidis [Weddell, no. 4320! Hb. Paris], ibidem, l. Bang [no. 642!] et Bang [no. 256!]; in vicin. Guanai, 2000 ft., l. Bang [no. 1593!] et Rusby [no. 643!]; Sierra de Santa Cruz, 3000 mt. s. m. l. O. Kuntze! Hic spectat etiam verosimiliter planta prope Soratam lecta [Rusby no. 650].

Ad descriptionem adde: capsulae pars inferior 10-costate, pars superior libera a corolla persistente coronata; semina minima, flavescentia, nitida, sub-ovoidea; cellulae testae polygonales.

2. SIPHOCAMPYLUS RADIATUS Rusby, Mem. Torr. Bot. Club, **6**: 73. 1896.

Vicin. Cochabamba [Bang, Pl. Boliv. no. 1106!] ibidem legit etiam plantam cultam O. Kuntze!

Frutex ad 3 m. altus, teste O. Kuntze in schedul. A *S. umbellato* proximo differt foliis angustioribus rigidiorisque, aliter serrulatis et eorum tomento, dein pedicellis glabris et lobis calycinis integris, arcuatim reflexis.

var. MINOR A. Zahlbr.

Planta omnibus in partibus minor et pedicelli folia superantes. Folia 12–16 cm. longa et 2.5–3 cm. lata; receptaculum calycis 8–10 mm. latum; lobi calycini 20–24 mm. longi; corolla 25–32 mm. longa.

Provinc. d'Atyopaya: Decbr.–flor. [Weddell no. 4178! Hb. Paris].

Frutex 2–3 metralis. [Wedd. in sched.]

3. SIPHOCAMPYLUS RUSBYANUS Britt. Bull. Torr. Bot. Club, **19**: 372. 1892.

Mapiri, 5000 ft. Apr.–flor. [Rusby, Pl. Boliv. no. 644!]; Corvico, Yungas, in sylvis. Sptbr.–flor. [Bang, Pl. Boliv. no. 2433!]

4. SIPHOCAMPYLUS TUNARENSIS A. Zahlbr.

Herbacea, lactescens. Caulis partes superiores compressiusculae et sulcatae, leviter arachnoideae. Folia alternantia, breviter petiolata (petiolo 5–7 mm. longo) oblongo-lanceolata, approximata et suberecta, utrinque (basi parum inaequaliter) acuminata, in margine minute et acute denticulata, tenuia, supra viridia, glaberrima, nitida, tenuiter reticulata, laevia, subtus opaca, dilutioria et (praesertim ad nervaturam) brunnescenti-subarachnoidea; costa crassiuscula, nervis lateralibus 19–21, sat tenuibus, suberecta adscendentibus; lamina 18–19 cm. longa et 4 cm. lata. Flores cinerascentes, lobis corollae fuscescentibus (O. Kuntze in sched.), versus apicem ramorum axillares et solitarii, pedicello longo, foliis tamen

breviore, 11–13 cm. longa, compresso, ebracteolato, et suberecto, subarachnoideo-pubescente; gemmae floriferae uncinatae. Receptaculum calycis depresso-terbinatum, in indistincte navosum, more pedicellorum vestitum, 13–15 mm. latum et 6–8 mm. altum, lobis calycinis limbo fere integro, distanter insertis, parvis, triangulari-subulatis, erectis, apice parum recurvis, in margine subintegris, 4 mm. longis et basi 2 mm. latis. Tubus corollae sat latus et brevis, 13–14 mm. longus et basi 11–12 mm. diam., rectus, e basi paulum latiore parum angustatus, 5-nervus, extus pubescens, intus glaber; lobi corollae tubo longiores, lineares, tortuosi et paulum falcati, 35–38 mm. longi et (basi) 3 mm. lati. Tubus staminum glaber parum curvatus, supra basi sat alte 5-fidus et basi corollae insertus; antherarum tubus glaber, 17–18 mm. longus et 4 mm. in diam., anthearum omnes in vertice breviter penicillatae. Ovarium solum parte basali receptaculo adnatum, late conicum; stigma bilobum, lobis oblongo-rotundatis, dorso glabrus. Fructus ignotus.

Tunari, 3600 mt. s. m., April–flor., l. O. Kuntze!

Habitu et formatione florium distincta species.

5. Siphocampylus Vatkeanus A. Zahlbr.

Frutex erectus caules validiusculi, in partibus junioribus, fuscescentes vel fusco-cinerascentes, floccoso-pulverulenti, compressiusculi; dein nudis et cicatricis foliorum dejectorum subcordatis ornati; medulla alba septata. Folia alternantia, petiolato, petiolo floccoso-pulverulento, 8–12 mm. longo-erecta vel suberecta, demum reflexa, ovato-oblonga, utrinque (basi inaequaliter) acuta, subcoriacea, in margine crebre et minute calloso-denticulata, dentibus obscurus et falcatis; lamina 8–14 cm. longa et 2.5–3.8 cm. lata, supra viridis vel viridi-rufescens, opaca, glabra et laevis, subrugulosa, subtus pallida, albido-lutescens, imprimum ad nervaturam brunnescentem subfloccoso-pulverulento, nervis secundariis 11–14 subangulo acuto versus marginem fere recte adscendentibus. Flores axillares, solitarii; pedicelli brunneo-pulverulenti, ebracteolati, compressiusculi, folia aequantia vel paulum superantes, apice curvatis, 8–12 cm. longi. Receptaculum calycis fere pyriforme, pulverulentum vel glabrescens, 7–9 mm. altum et 12–12 mm. latum; lobi calycini e sinubus latis distanter inserti, lanceolato-subulati, erecti, 10–12 mm. longi et basi 2 mm. lati, utrinque glabri, in margine obsolete denticulati, tubo corollae circa duplo breviores. Corollae tubus virescenti-albidus, 5-nervus, extus scabridulus, intus glaber, e basi latiore (12 mm.) angustatus et versus paucem iterum ampliatus, rectus, 2 cm. longus; lobi corollae falcati, 3 minores tubo breviores, 2 majores tubo longiores, usque ad

2.5 cm. longi. Staminum tubus basi 5-fidus, basi corollae adnatus, glaber, validiusculus (2–3 mm. in diam.), paulum curvatus et subanthesi tubo corollae exsertus; antherarum tubus coerulescenti-caesius, glaber vel parce et breviter pilosiusculus, antherarum 2 minores vertice pilosi. Stigma bilobum, lobis oblongis. Capsula demum nutans, pars basalis coriacea, 15–18 mm. alta et 20–22 mm. lata, valvi sublignosi, acuti, 6–7 mm. alti; semina parva, lutescenti-fusca, oblonga, irregulariter angulosa, vix 1 mm. longa.

Provinc. Larecaja, viciniis Sorata, inter Laripeta et Tani, in silvalis, regione temperata, 3000 mt. s. m. Maj.—flor. (Mandon, Pl. And. Boliv. No. 497 !)

Ab arcte affini *S. scabrifolio* Schlecht. apud Lechler, Berberid. Amer. austr. 58, 1857, et Lechler, Plant. Peruv. no. 2073 ! differt indumento ramorum (non glabris), floribus, majoribus et lobis calycinis tubo corollae duplo breviores.

6. Siphocampylus aureus Rusby, Mem. Torr. Bot. Club, **6**: 72. 1896.

Habitu *Lobeliam persicifoliam* fere simulat, attamen ex affinitate *S. virgati* A. DC. et *S. rosmarinifolii* G. Don notis allatis et jam floribus luteis bene distinguenda.

Vicin. Cochabamba, Espirito Santo (Bang, Pl. Boliv. no. 1234!) et loco accuratius non indicato, l. Cumming ! (Hb. Vindob.)

Var. latior A. Zahlbr.

Folia ovata vel oblonga (infima angustioria) acuminata, breviter petiolata—petiolo 3–4 mm. longo—in margine plus minus distincte undulata et minute calloso-denticulata, 5–7.5 cm. longa et 2.5–2.7 cm. lata. Flores paulum minores, ut in planta typica.

Sierra de Santa Cruz, 2600 mt. s. m. Maj.—flor. et fruct. l. O. Kuntze !

Capsula hujus varietatis (an etiam plantae typicae ?) chartacea, valvae receptaculo subaequilongae, oblongae, apice abrupta acuminatae, in lateribus profunde sulcatae; semina minima, flavido-brunnea, nitida, ellipsoidea vel subovoidea, 0.6–0.8 mm. longa.

7. Siphocampylus Kuntzeanus A. Zahlbr.

Caules teretiusculi, sat crassi (3–5 mm. in diam.) viridilutescentes, nitiduli glabri et striati, dense foliolati et multiflori. Folia alternantia, internodiis multo longioria, subsessilia, linearia, utrinque

sensim et longo attenuata, plus minus distincte recurvata, apice obtusiusculo, glaberrima, membranacea, supra viridia, subtus glaucescentia, in margine subintegra vel subundulata vel undulato-repanda, dentibus minutis, calloris, acutisque munita, 7–8.2–10 cm. longa et 0.6–0.8 cm. lata; costa subtus distincta, nervis lateralibus 8–11, ante margine arcuatim convexis. Flores versus apicem ramorum solitarii, axillares, pallide lutei; pedicelli foliis circa duplo breviores, filiformes, tereti, suberecti. Receptaculum turbinatum, 10-costatum, glabrum, 4 mm. altum et 5 mm. latum; lobi calycini receptaculo fere duplo longiores, subulati, recurvi, uninervi, in margine integri et paulum revoluti, e sinubus latis oriuntes, 8–11 mm. longi et 1–1.5 mm. lati. Corolla glabra, 5-nerva, e basi latiore angustata dein iterum versus faucem sensim ampliatus, 18 mm. longa et 6 mm in diam., lobis subulatis, fimbriatis, antico altius soluto. Staminum tubus glaber, basi 5-fidus et corollae parti angustatae adnatus, sub-anthesin corollae longiuscule exsertus; tubus antherarum lutescens, glaber, 8 mm. longa et 2 mm. in diam., antherarum 2 minores vertice breviter penicillatae. Capsula sat parva, chartacea, valvae late ovatae et abrupte acuminatae, in lateribus excavatis. Semina ut in *S. aureo.*

Sierra de Santa Cruz, l. O. Kuntze ! loco accuratius non indicato, l. Cumming ! (Hb. Vindob., Hb. Barbey-Boissier).

A *S. aureo* Rusby, cui proximus, differt caulibus dense foliatis, multifloris, foliis angustis et recurvis, floribus minoribus, corollae tubo fauce non constricto, tubo staminum longe exserto.

8. Siphocampylus Boliviensis A. Zahlbr. Annal. k. k. naturhist. Hofmus. Wien, **6**: 443. 1891. Britt. Bull. Torr. Bot. Club, **19**; 372 (errore "Bolivianus" citatus). 1892.

In provinc. Larecaja, vallis Tipuani [Weddell ! Hb. Paris], prope Soratam, 8000 ft. s. m. [Rusby no. 645 !], et ibidem in regione subalpina, 2700–3300 mt. s. m. in sepibus nemoribus undique [Mandon, Pl. And. Boliv. no. 496 !], prope Yungas [Weddell, no. 4268 ! Hb. Paris], Tunari, 3400 mt. s. m. [O. Kuntze !], loco accuratius non indicato. [Lobl, Hb. Vindob.]

9. Siphocampylus angustiflorus Schlecht. apud Lechler, Berberid. Amer. austr. 58, 1857 (nomen !), et Plantae Lechler. Peruv. no. 2649 !

Scandens, ramis gracilibus, striatulis, granuloso-scabridis, flavescenti-brunneis. Folia alternantia, chartacea, falcata et conduplicata breviter petiolata—petiolo 2–2.5 mm. longo—ovato-linearia

vel ovato-oblonga, basi rotundata, apice acuminata et breviter reduncа, in margine paulum revoluta et glanduloso-denticulata; lamina 5.3–5.7 cm. longa et 1.7–2.2 cm. lata, utrinque glaberrima et sub lente tenuiter punctulata, supra viridis subnitidaque, subtus pallidior et magis opaca, nervis lateralibus prominulis 5 sub angulo acuto adscendentibus et ante marginem furcatim divisis et connexis. Racemi et terminales et dein multi- (circa 20-) flori, unilaterales et laterales, breves, pauciflori et patentes. Flores rosei (Weddell in sched.), angusti, nutantes; pedicelli granuloso-scabriduli, retorti, basi incrassata bracteolo parvo muniti. Receptaculum obconicum, glabrum, 5-costatum, 4–5 mm. altum et 5 mm. latum, lobi calycini fauci receptaculi distanter inserti, parvi, recti, anguste triangulares, apice obtusiusculi et paulum recurvi, in margine fere integri vel in uno vel altera latere vel utrinque (rarius) denticulis 1–2 parvis obtusiusculisque obsiti. Corolla tubus utrinque glaber 5-nerva, e basi latiore sensim paulum attenuatus et dein iterum paulum dilatatus et fere cylindricus, 15 mm. longus et 4–5 mm. in diam., lobi corollae subulati, tortuosi, 12–14 mm. longi, 2 parum majores. Staminum tubus basi 5-fidus, glaber, sub anthesi tubo corollae subaequilongus; tubus antherarum glaber, 5 mm. longus, antherarum omnes (2 minores tamen longius) pilosae. Stigma bilobum, lobis ovato-oblongis, obtusiusculis. Capsulae valvae triangulares, circa 8 mm. alta et 7 mm. in diam., pars basalis (receptaculum calycis) nervis 5 validis prominulis et inter eos nervis 5 tenuioribus ornata.

In prov. Larecaja, valli Tipuani (Weddell! Hb. Paris).

10. Siphocamphylus flagelliformis A. Zahlbr.

Syn: *Siphocampylus angustiflorus* Britt. Bull. Torr. Bot. Club, **19**: 373, 1892, et apud Rusby, Plant. Boliv. exsicc. no. 646. Non Schlecht.

Frutex scandens, ramis flagelliformibus, teretibus, striatis, scabridulis, ochraceo-brunneis. Folia alternantia, internodiis paulum longiora, brevissime (circa 3 mm.), petiolata—petiolo crassiusculo, subtomentoso—reflexa, plana ovato-oblonga, apice acuminata, basi subangustata, in margine dentibus 11–14 parvis glandulosis acutiusculis munita, coriacea, lamina 6.8–7 cm. longa et 2.5–3 cm. lata, supra opaca nervatura impressa et pilis brevissimis obsita, viridis, subtus pallidior, imprimum ad nervos brunneos hirta, nervi laterales 7, subangulo semirecto assurgentes. Racemi et etrminales longi, laxiflori et haud unilaterales et dein basi folioloses et axillares nudae; pedicelli contorti, subtomentosi, 10–12 mm. longi, basi bracteolo, filiformi dimidium pedicelli vix attingente obsiti. Receptaculum calycis obconicum, hirtum, pauce incrassatum, 3 mm.

longum et totidem fere latum; lobi calycini parvi, triangulares, late distantes, extus hirti, intus glabri, 2 mm. longi et basi circa, 1 mm. lati, in margine vel utrinque vel in uno latere dentibus 2 (rarius 1) muniti. Corolla angusta, 25 mm. longa, rosea; tubus corollae e basi latiore parum constrictus et dein fere cylindricus, lobi corollae lineares, 6–8 mm. longi. Staminum tubus basi fissus; tubus antherarum glaber, flavidus nitidusque; antherae omnes, sed 2 minores longius pilosae. Capsulae pars inferior obconica, costulata, 8 mm. alta et 7 mm. lata, valvae subcornutae, 4–5 mm. longae. Semina parva, oblonga, fusca, circa 1 mm. longa.

Prope Yungas, 4000 ft. s. m. [Rusby, Plant. Boliv. no. 646!]

Differt a proximo *S. angustiflora* Schlecht. ramis elongatis flagelliformibusque, tomento alio, foliis planis, non conduplicatis nec falcatis majoribus, firmioribus et aliter formatis, floribus breviter pedicellatis et lobis calycinis non glabris.

11. Siphocampylus oblongifolius Rusby, Mem. Torr. Bot. Club, **6**: 73. 1896.

Guanai-Tipuani, April–Jun.–flor. [Bang, Plant. Boliv. no. 1461!]

12. Siphocampylus Andinus Britt. Bull. Torr. Bot. Club, **19**: 373. 1892.

Unduavi, 8000 ft. s. m. [Rusby, Plant. Boliv. No. 941!] Sequenti affinis et forma laborum calycinorum species distincta.

13. Siphocampylus elegans Planch. in Flore des Serres, **6**: 19, c. icon. 1850–51.

Var. Boliviensis A. Zahlbr.

Folia apice cuspidata, basi inaequali rotundata vel subrotundata.

Prov. Larecaja, viciniis Sorata, inter Cerro de Chilicca et Alto de Soque, in nemoribus, 2800–3000 mt. s. m. reg. temper. [Mandon, Plant. And. Boliv. no. 498!] Unduavi, Septbr.-flor. [Bang, Pl. Boliv. no. 2491!]

Var. cordatus A. Zahlbr.

Folia basi distincte cordata, apice plus minus abrupte cuspidata.

In valle Rio Tuntas, 2000 mt. s. m. Apr.–flor., l. O.

Kuntze!; Santa Rosa, 2600 mt. s. m. Apr.–flor., l. O. Kuntze!; mont. Tunari, 3000 mt. s. m, Aprl.–flor., l. O. Kuntze!

14. Siphocampylus correoides A. Zahlbr.

Scandens, ramis elongatis, gracilibus (2–3 mm. in diam.), teretiusculis, dense ferrugineo-tomentosis. Folia alternantia, internodia subsequantia vel iis paulum longiora, reflexa, crassiuscula, sat parva, petiolata (petiolo brevi 3–6 mm. longo,) ferrugineo-tomentoso-ovata vel ovato-oblonga, apice acuta, basi paulum angustata vel rotundata, in margine dentibus utrinque 4–5 tenuibus et falcatis munita; lamina 2.5–3 cm. longa et 0.8–2 cm. lata, supra viridis, opaca, scabrida, subtus albida vel subargentea, nitidula, pilis parvis ferrugineis obsita, costa distincta et nervis lateralibus 3 e parte basali folii oriuntes. Flores solitarii, axillares, longe pedicellata, pedicello teretiusculo, suberecto, ferrugineo-tomentoso, foliis multo longiore, ebracteolato, 5.5–6 cm. longo. Receptaculum calycis obconicum, ferrugineo-subtomentosum, 4–5 mm. altum et 7–8 mm. latum; lobi calycini parvi, erecti, anguste triangulares, obtusiuscula, in margine utrinque denta unico muniti, e sinubus latis fere rectis adscendentes, receptaculo breviores, 3 mm. alti et basi 2 mm. lati, ferrugineo-puberuli. Corollae tubus e basi ampla sensim angustatus et dein iterum sensim versus paucem ampliatus, extus ochraceo-pubescens, intus glaber, 5-nervus. Tubus staminum glaber, basi alte 5-fidus et tubo corollae adnatus; antherarum tubus coerulescens, pruinosus, glaber; antherarum 2 minores vertice penicillatae. Fructus ignotus.

Unduavi, Yungas. Septbr.–flor. [Bang, Plant. Boliv. no. 2483!]

Planta habitu peculiari. Descriptio ad specimen mancum condita ulterius emendanda.

15. Siphocampylus bilabiatus A. Zahlbr.

Planta suberecta, caulibus sat crassis, teretibus, breviter pubescentibus, lutescenti-viridibus, medulla alba farctis. Folia alternantia (versus apicem ramorum approximata et fere verticillata), internodiis longiora, breviter petiolata (petiolo pubescente, sigmoideo, 9–12 mm. longo) ovata vel ovato-oblonga, versus apicem sensim acuminata, acuta, basi subcordata, in margine inaequaliter et acute denticulata, rigida, fuscescentia; lamina 8.5–9.5 cm. longa et 2.5–3.5 cm. lata, supra glabra et laevis, nervatura impressa, subtus molliter pubescens, nervatura prominente, pallidiore, nervis secundariis 6–7 subangulo acuto adscentibus et arte marginem arcuatim et farcatim connexis; flores in partibus superioribus plantae axillares, solitarii vel in apice subracemosi, pedicellis foliis

brevioribus, tortuosis, ebracteolatis, pubescentibus patentibus vel subnutantibus, 2.5–3.5 cm. longis. Receptaculum calycis late turbinatum, pubescens, 5–nervum, 4–5 mm. altum et 8–10 mm. latum; lobi calcycini subulati, erecti et subfalcati, integri, uninervi, utrinque (ad extus densius) pubescentes, 16–19 mm. longi et basi 1.5 mm. lati, sinubus latis fere planis innati. Corollae tubus extus pubescens, 5–nervus, subrectus, supra basin latiorem paulum angustatus et versus faucem sensim et parum dilatatus, 3.5 cm. longus et ad paucem 7–9 mm. latus; lobi corollae bilabiati, 2 superiores alte connati, galeiformes, apice breviter liberi et subfalcati, 3 inferiores subaequales, falcati vel involuti, undulati. Staminum tubus basi latiori corollae adnatus, pubescens; antherarum tubus hispidus, antherarum 2 minores vertice longe penicillatae. Stigma sub anthesi paulum exsertum, bilobum. Capsulae receptaculum pauce callosum, 10–12 mm. altum et 12–14 mm. latum, valvae receptaculo breviores, triangulares. Semina oblonga, fuscescentia, nitida, circa 1 mm. longa.

Corvico, Yungas. Septbr.—flor. [Bang, Pl. Boliv. no. 2464 !]

Ex affinitate *S. nitidi* Pohl, corolla bilabiata distincta.

16. Siphocampylus argutus A. Zahlbr.

Herbacea, erecta (?). Caules sat graciles, in partibus superioribus 2.5–3 mm. in diam., teretes, glabri, leviter roseo-suffusi, medulla lutescenti-albida farcti. Folia alternantia, suberecti, internodiis multo longiora, petiolata (petiolo paulum tortuoso, 9–11 mm. longo, supra basin bracteolo minuto obsito) ovata vel ovato-oblonga, apice sensim acuminata vel subcuspidata et breviter falcata, basi cordata, in margine inaequaliter et acute denticulata, tenuia; lamina 9.5–10.5 cm. longa et 3–4 cm. lata, supra opaca, viridis, scabridule, pilis brevissimis sparsis obsita vel glabrescens, subtus glabra, nitidula, laevis, costa parum prominente, nervis lateralibus tenuibus 7 subangulo acuto assurgentibus. Flores in apice caulis axillares et solitarii; pedicello tereti striatulo, hirto, petiolo longiore, sed foliis multo breviore, 17–19 mm. longo. Receptaculum calycis campanulato-obconicum, hirtum, 5-nervum; lobi calycini subulati, canaliculati, primum erecti demum recurvi, receptaculo duplo circa longiores, integerrimi, hirti, sinubus latis subplanis distanter inserti, 6–8 mm. longi et basi 1–2 mm. lati. Corollae tubus kermesinus, extus pubescens, leviter curvatus, e basi subglobosa sensim et parum angustatus, dein subcylindricus et iterum parum sensimque ampliatus, versus faucem angustior, 3.2–3.5 mm. longus, angustus; lobi corollae subfalcati, undulati, 1.6–1.8 cm. longi. Staminum tubus pubescens, sub anthesi tubo corollae inclusus, antherarum tu-

bus coeruleus, in commissuris sulcatis albo-pilosa, antherarum 2 minores vertice penicillata. Capsula non visa.

A *Siphocampylo bilabiato* A. Zahlbr. differt indumento, foliis tenuibus, subcuspidato-falcatis, nervatura tenui, floribus breviter pedicellatis et corolla alia. Accedit etiam valde ad *Siphocampylum volubilem* G. Don, scandentem qui tamen distat foliis minoribus, longius petiolatis, tubo corollae glabro, lobis calycinis brevioribus, receptaculum subaequestibus.

Yungas [Bang, Plant. Boliv. no. 2045 !].

17. Siphocampylus tupaeformis A. Zahlbr. Annal. k. k. naturhist. Hofmus. Wien, **6**: 440. 1891.

Folia usque ad 12 cm. longa et ad 4 cm. lata, apice acuta vel rarius obtiuscula.

Late in Bolivia distributa. Prov. Larecaja, viciniis Sorata, colle Quincocuca, via ad Lacatia, in dumosis in regione subalpina, 2650–3700 mt. s. m. [Mandon, Plant. And. Boliv. no. 495 !], in valle Tipuani, in arvis humidis [Weddell no. 4697 ! Hb. Paris]; Prov. Tomina (départ. de Chuquisaca) in umbrosis, Decbr.–Jan.–flor. [Weddell no. 3760 ! et 3387 ! Hb. Paris]; Vic. La Paz 1000 ft. s. m. [Bang, Plant. Boliv. no. 77 !], Tunari, 3400 mt. s. m., l. O. Kuntze !; locis accuratius non indicatis legerunt Cumming no. 109 ! [Hb. Vindob.] et Bridges ! [Hb. Boissier.]

18. Siphocampylus corymbiferus (Presl.) Pohl, Plant. Brasil. **2**: 112. *tab. 175*, 1831; Kanitz apud Martius, Flora Brasil. **6**: Pars 4, 154. 1878.

Lobelia corymbifera Presl, Prodr. Monogr. Lobeliae. 37. 1836.

Siphocampylus gracilis var. *glabris* Britt. Bull. Torr. Bot. Club, **19**: 374. 1892.

Rami et folia glabra.

Prov. Larecaja, viciniis Ananea, in silvulis [Mandon, Pl. And. Boliv. no. 499 !], Unduavi [Rusby, Pl. Boliv. no. 639 !], Yungas [Rusby, Plant. Boliv. no. 251, a.].

Var. gracilis (Britt.) A. Zahlbr.

Siphocampylus gracilis Britt. Bull. Torr. Bot. Club, **19**: 374. 1892.

Rami et folia utrinque molliter pubescentia. Caeteris characteribus cum planta typica convenit.

Prov. Yungas, in declivibus humidis; Decbr.–flor. [Weddell no. 4219! Hb. Paris, Rusby, Plant. Boliv. no. 256a! 256b! et 640!]

Planta quoad indumentum valde variabilis. Speciminum originalium Pohlianorum in Herb. Vindobonensi asservatorum unum [no. 2380!] omnino glabrum, alterum foliis utrinque, subtus ad nervaturam paulum densius, parce et distanter pubescentibus, caulibus tamen glabris gaudet. Var. *gracilis* etiam Brasiliae obvenit, ubi in provincia Minas Geraës, l. Regnell [III Ser. no. 824! et 825 pr. p!]

19. Siphocampylus (?) dubius A. Zahlbr.

Herbacea; caules in partibus superioribus compressiusculi sulcatique, fuscescenti-hirti. Folia alternantia, internodiis 3–4-plo longiora, petiolata (petiolo 6–10 mm. longo), ovata vel ovato-oblonga, apice acuminata, basi in petiolum abrupte angustata, in margine dentibus callosis acutiusculis munita; lamina 6–10 cm. longa et 3–5 cm. lata, supra viridis, opaca, pilis albidis brevissimis et distantibus obsita, subtus glaucescens, nitidulus, excepta nervatura fuscescenti-hirta glabra; nervis lateralibus 6–8 semierectis. Flores versus apicem caulis axillares et solitarii, pedicellis compressiusculis, fuscescenti-hirtis, 5.5–7.5 cm. longis, foliis paulum longioribus. Receptaculum subglobosum, hirtum, 10-costatum; lobi calycini triangulari-subulati, late distantes, erecti, in margine utrinque 4–5 dentibus callosis, acutis patentibusque muniti, 8 mm. longi et basi 2.5 cm. lati. Corolla kermesina, tubus e basi parum latiore subcylindricus, leviter curvatus, 4 cm. longus, lobis corollae longiusculis, ad 15 mm. longis, subulatis et tortuosis. Staminum tubus glaber, tubo alti adnatus; antherarum tubus glaber, coerulescens, antherarum 2 minores vertice appendice triangulari coronatae. Ovarium sub anthesi solum basi receptaculi adnatum, caeterum liberum, fructus ignotus.

Unduavi, 8000 ft. s. m., Octbr.–flor. [Rusby, Pl. Boliv. no. 637! sub *Centropog. surinamensi.*]

An potius *Centropogonis* species, cujus etiam habitum praebet. Ovarium a receptaculo fere liberum peculiare.

20. Siphocampylus membranaceus Britt. Bull. Torr. Bot. Club, 19: 372. 1892.

Yungas, 6000 ft. s. m. [Rusby, Pl. Boliv. no. 651].

Planta mihi ignota.

III. LAURENTIA Neck.

LAURENTIA MICRANTHA (H. B. K.) A. Zahlbr.

Lobelia micrantha H. B. K. Nova Gener. et Spec. Plant. **3**: 316. 1818. A. DC. apud DC. Prodr. **7**: Pars 2, 373. 1839. Britton, Bull. Torr. Bot. Club, **19**: 347. 1892.

Lobelia parviflora Mart. et Gal. Bull. Acad. Roy. Bruxelles, 9: 41. 1842. Galeotti Pl. Mexic. exsicc. no. 1970!

Calycis lobi tubo corollae sub-cylindrico dorso brevissime fisso subaequilongi vel dimidium superantes; staminum tubus basi 5-fidus sub fauce corollae insertus, antherarum tubus brevis, fere globosus, antherarum 2 minores hirtellae. Ovarium superum, fusiforme; capsulae apice 2-valvata.

Viciniis Sorata, in dumosis, schistosis, ad sepes undique, 2600–2800 mt. s. m. [Mandon, Pl. And. Boliv. no. 493!]; prope Mapiri, 5000 ft. s. m. [Bang, Pl. Boliv. no. 1967.]

Planta in America centrali et meridionali-occidentali late distributa et sat variabilis ab corollae tubum cylindricum solum apice breviter fissum et ab tubum staminum alte insertum ad *Laurentias* ducenda. Valde ei affinis est *Laurentia ovatifolia* Robins. in Proceed. Americ. Acad. Boston, **26**: 166, 1891; Pringle, Pl. Mexic. no. 3302! (sub *L. Michoacana* var. *ovatifolia* Robins.), sed differt foliis inferoribus sat longe petiolatis, basi cordatis. A *Laurentia ramosissima* Benth. et Hook. (*Lobelia ramosissima* Mart. et Gal.), cui etiam accedit, distet jam floribus multo minoribus. *Laurentia Michoacana* Robins. apud Pringle, Pl. Mexic. no. 3337! (cfr. l. s. c. p. 167) verosimiliter varietas est *Laurentiae micranthae*, lobis calycinis parum aliter formatis differens.

IV. RHIZOCEPHALUM Wedd.

Lobi calycini lineares, corollae 12–40 mm. longa, intus villosa. *Rh. Candollii.*
Lobi calycini triangulares, corolla 7–9 mm. longa, lobi corollae intus glabri. *Rh. pumilum.*

1. RHIZOCEPHALUM CANDOLLII Wedd. Chloris Andina, **2**: 12. 1857.

a) *laciniatum* Wedd. l. c.

Syn.: *Lysipoma laciniatum* A. DC. apud DC. Prodr. **7**: Pars 2, 349. 1839.

β) *vulgare* Wedd. l. c. *tab. 46, fig. 1.*

Varietates ambae in pratis humidis vel paludosis in regione alpina in provinciis de la Paz, de Chuquisaca et de Cochabamba, l. Weddell; prov. Larecaja viciniis Sorata in regione subalpina, undique in graminosis, 3200–3600 mt. s. m. Apr.–flor. [Mandon, Plant. And. Boliv. no. 491 !], loco accuratius non indicato, l. Pentland [DC. Prodr. l. s. c.].

2. RHIZOCEPHALUM PUMILUM Wedd. Chloris Andina, **2**: 13. 1857.

Provinc. Larecaja, viciniis Sorata, prope Vancuiri in paludosis, 4500 mt. s. m. [Mandon, Plant. And. Boliv. no. 492 !], Unduavi 8000 ft. s. m. [Rusby, Plant. Boliv. no. 2445.]

V. HYPSELA Presl.

Folia in apice ramulorum subfasciculata	*H. subsessilis.*
Folia in ramulis sparsa	2
2. Corollae laciniiae circiter longitudine tubi vel eo vix breviores	*H. reniformis.*
Corollae laciniae dimidio tubi circiter aequilongi	*H. oligophylla.*

1. HYPSELA RENIFORMIS (H. B. K.) Presl, Prodr. Mongr. Lobeliae. 45. 1836.

Lysipoma reniformis H. B. K. Nov. Gen. et Spec. Plant. **3**: 320. *tab. 266, fig. 1.* 1818. A. DC. apud DC. Prodr. **2**: Pars 2, 350. 1839.

Pratia repens Wedd. Chloris Andina, **2**: 9. 1857. Non Gandich. teste Benth. et Hook. Gener. Plant. **2**: 550. 1873.

In vicinitate de la Paz, 4000 mt. s. m. et in pratis paludosis de la Lancha [Weddell].

2. HYPSELA OLIGOPHYLLA (Wedd.) Benth. et Hook. Gener. Plant. **2**: 550. 1873.

Pratia oligophylla Wedd. Chloris Andina, **2**: 10. *tab. 45, fig. B.* 1857.

Prov. Larecaja, viciniis Achacache, ad ripas lacus Titicaca, in regione alpina in arenosis, 3920 mt. s. m. Mart. Flor. [Mandon, Plant. And. Boliv. no. 489 !]

3. HYPSELA SUBSESSILIS (Wedd.) Benth. et Hook. Gener. Plant. **2**: 550. 1873.

Pratia subsessilis Wedd. Chloris Andina, **2**: 10. 1857.

In pratis subpaludosis et ad margines rivulorum in provincia Cinti, 3500 mt. s. m. [Weddell].

VI. LOBELIA L.

Herbae repentes	2
Herbae elatae	3
2. Folia integra	*L. nana.*
Folia denticulata	*L. Boliviensis.*
3. Ovarium inferum	*L. Gardneriana.*
Ovarium superum vel semisuperum	*L. Cliffortiana* var. *Xalapensis.*

1. Lobelia nana H. B. K. Nov. Gen. et Spec. Plant. **3**: 317. *tab. 272.* 1818. A. DC. apud DC. Prodr. **7**: Pars 2, 379. 1839. Weddell, Chloris And. **2**: 13, *tab. 46, fig. A.* 1857. Viciniis Sorata, Novbr.–flor. [Bang. Pl. Boliv. no. 1622!]

var. flagelliformis Wedd. Chloris Andina, **2**: 13. 1857.

In regione alpestri et alpina provinc. Cochabamba [Weddell]; viciniis Sorata in graminosis 2650–3200 mt. s. m. Febr.–flor. [Mandon, Plant. And. Boliv. no. 1463!]. Bang, no. 1075 verosimiliter etiam huc spectat.

2. Lobelia Boliviensis (A. DC.) Wedd. Chloris Andina, **2**: 11. 1857.

Pratia (?) Boliviensis A. DC. apud DC. Prodr. **7**: Pars 2, 340. 1839.

Sine loco accuratius indicato; l. Pentland.

3. Lobelia Gardneriana Kanitz apud Mart. Flora Brasil. **6**: Pars 4, 138. 1878. Gardner, Pl. Brasil. exs. no. 2655!

Provinc. Velasco, 200 mt. s. m. et ad flumen Rio Yapacani 400 mt. s. m., l. O. Kuntze!

4. Lobelia Cliffortiana var. Xalapensis A. Gray, Synoptic. Flora North Amer. **2**: Part 1, 7. 1886.

Lobelia Xalapensis H.B.K. Nova Gen. et Spec. Plant. **3**: 315. 1818. A. DC. apud DC. Prodr. **7**: Pars 2, 372. 1839.

Prov. Velasco, ad vias sylvarum et prope Yapacani, l. O. Kuntze!; Coripata, Yungas, in sylvis; Septbr.–flor. [Bang, Pl. Boliv. no. 2162!]

Galium trifidum and its North American Allies.

By Karl M. Wiegand.

For many years this group of plants has seemed to the writer one of the most perplexing with which the American botanist has to deal. Two individuals would appear so distinct as to be at once taken for distinct species, but all text-books referred both to the one name *G. trifidum*, "an exceedingly variable species." Distrust was aroused more and more as to the correctness of this treatment of *Galium* since experience shows that species in other genera very rarely exhibit such a wide range of indefinite variation. The complexity of many aggregate species is found to be due to the confusion of distinct but closely related sub-groups, and not to one single unbroken and highly variable species. To distinguish and designate these sub-groups when they exist is unquestionably a benefit to our conception of the group as a whole, and it was on this account largely that the study was undertaken which led to the present paper.

It was soon apparent that this was the principal cause of the confusion in the case of *Galium*. *G. trifidum* L. which was designated as the "highly variable" species, although its components still exhibit a remarkable amount of variability, readily allows of segregation into a number of well defined species and as many good varieties which are as distinct as most of the other North Americal representatives of this genus. The following discussion is an attempt to bring the "*trifidum*" group into a more orderly condition.

There has always been considerable difference of opinion as to the taxonomic value of different characters in the genus *Galium*. We shall concern ourselves merely with those used to separate the species of the *trifidum* group. The conception of a species here as elsewhere, of course necessarily differs with the individual. It will be readily seen in the synopsis given below that the greatest importance is placed upon a so-called "internal character," namely the form that the seed presents in cross-section. Practically speaking this means the cross-section of the endosperm and does not include the carpellary coat. This character so far as known to the

writer is here used for the first time, and a brief explanation may be necessary. The endosperm is closely surrounded by the seed-coat and usually does not fill the entire carpel. In the group with lunate cross-section the endosperm is more or less grooved upon the inner face, thus producing the crescent-shaped appearance. In the other group this groove is greatly exaggerated. Not only is it very deep, but the sides are extended until they meet at the inner angle of the carpel, and thus the endosperm becomes a hollow sphere filled at first with the cellular seed-coat, but at maturity entirely empty except for the air which it contains, and which probably aids in floating the seed upon the water. A complete discussion of the fruit characters in the genus *Galium* will soon appear in a separate paper, and therefore nothing more need be said here upon this subject. Curiously enough the type of inflorescence seems to supplement the fruit characters. In the writer's opinion the number of corolla lobes offers a specific character. The plants are not "either" 3- or 4-merous, but the small three-parted obtuse lobed corolla represents one group of species as is shown by the supplementary characters of a smooth stem and a peculiar general appearance; while the four-parted large and acute lobed corolla just as accurately defines another group of species, and the character is here again supplemented by other characters. Valuable characters have been drawn from the arrangement of the flowers and the nature of the pedicels, while the leaves have not as a whole yielded good results. Very little dependence could be placed upon the number of leaves in a whorl.

Linnaeus in 1753 described a species of *Galium* as *G. trifidum*, habitat Canada. It is necessary first of all to determine just what plant this name represents. Many of the earlier botanists were in doubt as to this point. Most of them, however, decided to include under it all the obtuse leaved forms treated in this present paper. Hooker, however, having in hand perhaps mostly material from the States, and not having seen the true American type, considered the European form distinct, and to the American plant gave Michaux's name *G. Claytoni*. After this time the two forms were again united and have remained so until the present time. It becomes evident, however, that the small bog form, the

G. trifidum var. *pusillum* Gray, should be considered the type rather than the larger more southern plant. That these two American forms are distinct every one must admit after an examination of numerous specimens. The habit, inflorescence and nature of the floral pedicels afford abundant characters for their separation. The *G. Claytoni* of Michaux, although somewhat ambiguous, refers without much doubt to this southern form, as may be inferred from his description, "fascicles of the branches terminal, etc." The writer has therefore adopted this as the oldest name for the species. Does the *G. trifidum* of Linnaeus refer to the slender bog plant with scabrous pedicels? This can be at once decided in the affirmative by a careful analysis of his description; "stem procumbent, peduncles often in threes, very slender, as long as the leaves, one-flowered, flower 3-parted." Willdenow says "habitat in Dania, Canada, Kalm," which makes it all the more probable that this was Linnaeus' plant, since Kalm collected only in the North. It also shows that even Willdenow considered the slender American form identical with the European. This is without doubt correct. After studying several specimens from Germany and Lapland, and inspecting OEder's plate in the Flora Danica no other conclusion can be entertained; they are identical in every essential feature. Very good descriptions are given by Wahlenburg, Roemer and Schultes and Ledebour.

Two varieties of *G. trifidum* are here described as new. Var. *Pacificum*, the more distinct, at first sight seems quite different from our eastern plant. Close examination, however, shows that the essential characters of the two are the same. Both have the diffuse habit, scabrous stems, trifid corolla and slender scabrous pedicels which in this variety are almost always axillary and lateral. The difference is mostly in the leaf. Var. *Pacificum* is the extreme of the *trifidum* series. While the type has but few lateral pedicels, this variety has those only. Somewhat intermediate between these two forms, and having a wider range than the last variety, is the var. *subbiflorum*, including western forms with narrower leaves and stouter more often glabrous pedicels than var. *Pacificum*. These pedicels often show a tendency to become 2- or 3-flowered. It has affinities on the one hand with *G. Claytoni*, and on the other in its smaller forms with *G. Brandegeei*.

G. Brandegeei was described by Dr. Gray from material collected by T. S. Brandegee in northern New Mexico. The essential features separating it from *G. trifidum* were supposed to be its peculiar matted cespitose habit, short stems, small fleshy leaves, and short mostly axillary pedicels. An examination of the type shows that many other Rocky Mountain and Pacific Coast specimens must on this basis be included in this species. Specimens from California, Wyoming, Colorado, Nevada and the Saskatchewan are practically identical with the Brandegee type. *G. Brandegeei* seems to be a good species, although rather closely related to *G. trifidum*. Its essential features are as stated above, the cespitose habit, generally smooth stem, broad and slightly fleshy leaves, and short glabrous one-flowered lateral pedicels.

G. arcuatum is here described as new. It includes a peculiar group of plants somewhat related to *G. bifolium* Wats., as well as to *G. trifidum*, but it is quite distinct from any described species. The distinguishing features are the long rather obtusely angled stem, acute leaves, and short stout recurved lateral pedicels. Specimens were distributed by Mr. Howell named *G. trifidum* var. *cuspidulatum* Gray; otherwise this species has never received a name.

G. tinctorium L. has long been an ambiguous species. Many botanists have attempted to separate it, but so far with very little success. From the description given by Linnaeus one can scarcely tell which plant is meant, but relying upon Willdenow, it is evident that this name must be applied to our large-leaved smooth eastern form with four-cleft corolla. *G. tinctorium* is perhaps the most variable of any species of this group. A careful comparison of a great many specimens, however, enables us to separate it into four well-marked and fairly distinct series, but which are too closely related to allow of specific distinction. The type is here taken to be the ordinary form of the Eastern States, with large leaves varying from linear to lance-ovate. Descriptions given by the early authors fit this better than any other, and besides it is the one most likely to be met with by the early travelers. This type includes the *G. trifidum latifolium* of Torrey and later authors. Specimens intermediate between the broad-leaved form and the narrower are more numerous than either extreme. A very dis-

tinct variety, and one that may in the future allow of specific rank, is the var. *Labradoricum*, which toward its southern limit at least inhabits only sphagnous bogs. It was first thought to be a seedling plant of the ordinary form, but material examined from many localities shows it to be quite constant and distinct. The var. *filifolium* includes a well-defined series of Atlantic coast specimens, distinguished by their diffuse habit, naked inflorescence, large flowers, and exceedingly narrow, papillose leaves. Florida specimens of *G. tinctorium* differ from the type in being slender and weak, with spatulate leaves, and a few prickles upon the stem. They are very close to *G. Claytoni*, and have been separated as var. *Floridanum*.

A certain number of American species are distinguished from those discussed above by the lunate cross-section of the seed. The most interesting of all of these is *G. palustre* L. Apparently very few botanists have suspected that this occurs in America, and yet specimens are at hand from all parts of the eastern States. In most herbaria it is labelled *G. trifidum latifolium* Torr. It grows abundantly in the marshes about Cayuga Lake, New York, where the writer has had an opportunity to watch it for several years, thinking it a new species. It was only recently that it occurred to him to compare it with the *G. palustre* of Europe, and the surprise was great indeed when it was found that the two correspond exactly. Material from all parts of the range given below has been compared with specimens from various parts of Europe, and there is now no further doubt but that they are identical. Just as there are few flowered and densely flowered specimens from America, so also specimens are found in Europe with closely cymose infloresence and others bearing only a few flowers.

The question as to whether *G. palustre* is indigenous in America or not is indeed perplexing. Specimens collected at Ithaca have always been in open places near lines of traffic, commonly along roadsides or on the shores of Cayuga Lake. The limited distribution would also suggest its being introduced. On the other hand, the earliest specimen observed was collected by Macrae at Montreal in 1842, and probably the plant referred to by Hooker as *G. tinctorium* was also this species. The question can scarcely be settled at present.

Several specimens from the northwest coast have at the same time a 3-parted corolla, cymose flowers and annular seeds. In habit they suggest *G. asprellum*, but are really quite distinct from any described species. They are here named *G. cymosum*.

There is little to be said about the other species treated in this paper, viz., *G. concinnum*, *asprellum*, *asperrimum* and *triflorum*. They are as a whole quite constant in their characters, and have already been well treated by Dr. Gray in the Synoptical Flora.

A few words might be said about the relation of these species to each other. *G. palustre*, both on account of its fruit and its inflorescence and method of branching, shows an affinity with *G. asprellum*, while the leaves are exactly like those of *G. Claytoni*. It is therefore a transition, as it were, from *G. trifidum* and *G. Claytoni* to *G. asprellum* and its closer relatives. *G. concinnum* stands somewhat alone, its affinity being with *G. asprellum*. The series then progresses through *G. asperrimum*, with slightly hispid fruits to *G. triflorum* with its large broad leaves and long-hirsute carpels, and on to *G. aparine* and its allies.

Below are given the synonomy, description and range of each species and variety discussed in this paper, together with a list of the more important specimens studied taken by States. For convenience, a synopsis of the species is also given.

The writer wishes to express his sincere thanks to Dr. Robinson and Dr. Small, who have kindly loaned him the important collections of *Galium* in their charge for use in the preparation of this paper.

Synopsis of the Species discussed.

A. ENDOSPERM ANNULAR IN CROSS-SECTION; FRUIT GLABROUS.

a. *Flowers in terminal clusters of three, or axillary and solitary.*

* Corolla 4-parted, lobes acute; stem smooth or nearly so.

Leaves linear, acute, mostly in 4's; plant large, stem long and weak; branches 2 or 3 at each node; flowers axillary and solitary on short recurved pedicels; corolla lobes acuminate. Western species. *G. arcuatum.*

Leaves lance-linear, obtuse, mostly in 4's, scabrous on the margin and midrib; plant smaller, stem more strict and (except in one variety) mostly erect; branches commonly solitary; flowers on slender straight pedicels in terminal clusters of three; corolla lobes acute. Species of the Great Plains and eastward. *G. tinctorium.*

* * Corolla 3-parted, small (1½ mm. or less in diam.), lobes obtuse; stem retrorse-hispid, or in *G. Brandegeei* smooth; branches of the plant commonly in 2's or 3's.

Pedicels stout, glabrous; flowers lateral, solitary; plants low and cespitose, stem 4–10 cm. high, mostly glabrous; leaves small, in 4's, broadly spatulate, slightly fleshy, glabrous, veins indistinct; flowers of medium size. Western species.

G. Brandegeei.

Pedicels slender, scabrous, often almost capillary, solitary and lateral or in terminal clusters of three; stems slender, diffuse, weak and reclining, retrorse hispid; leaves narrowly linear or larger and broadly spatulate, commonly in 4's, scabrous on the margin and midrib; flowers minute. Northern and western species.

G. trifidum.

Pedicels stout, glabrous, in terminal clusters of three; plants diffusely branched, stem mostly erect, retrorse-hispid; leaves linear, obtuse, scabrous on the margin and midrib, mostly in 5's and 6's, flowers small. Species of the Great Plains and eastward.

G. Claytoni.

b. *Flowers cymose (pedicels irregularly branching); corolla large, 2 mm. in diam., lobes ovate-triangular, obtuse; leaves commonly in 5's or 6's, obtuse; branches spreading; stem slightly roughened. Western species.*

G. cymosum.

B. ENDOSPERM LUNATE IN CROSS-SECTION; FLOWERS WHITE, PURPLISH OR GREENISH, NUMEROUS IN TERMINAL AND LATERAL CYMOSE CLUSTERS; COROLLA 4-PARTED; BRANCHES OF THE PLANT IN TWOS OR THREES.

a. *Leaves obtuse, mostly thin and dull, in 2's to 6's; flowers numerous on slender pedicels; corolla white, lobes acute; fruit glabrous. Northeastern species.*

G. palustre.

b. *Leaves acute or cuspidate.*

Fruit glabrous, pedicels capillary; corolla white, lobes acute or acuminate; leaves linear, slightly mucronate, mostly in 6's; stem low and nearly smooth. Eastern species. *G. concinnum.*

Fruit glabrous on slender pedicels in a very large compound cyme; corolla white, lobes acuminate; leaves short, elliptic-linear, strongly cuspidate, mostly in 6's; stem long and ascending, very retrorse-hispid. Northeastern species.

G. asprellum.

Fruit minutely uncinate-hispid, pedicels long and capillary; corolla whitish or purplish, lobes acuminate; leaves mostly in 6's, large, linear to broadly elliptic-linear, acute at each end, strongly cuspidate; stem long and weak, very rough. Pacific Coast species. *G. asperrimum.*

Fruit strongly uncinate-hispid; inflorescence few-flowered, pedicels stout, mostly in threes; corolla purplish or greenish, lobes acuminate; leaves mostly in 6's, large, broadly elliptic-linear, cuspidate, more flaccid than in the other species of this section; stems prostrate or rarely ascending, glabrous or hirsute. Distribution general. *G. triflorum.*

1. GALIUM ARCUATUM n. sp.

G. trifidum cuspidulatum Gray, ined.

Perennial, very large; stems ascending or reclining, 3–12 dm. high, glabrous, rather obtusely angled, diffusely branched, branch-

es two or three at each node; leaves elliptic-linear, acute at each end (7–22 mm. by 1–4 mm.), 1-nerved, thin, commonly in 4's, unequal, scabrous on the margin and midrib; flowers axillary (rarely terminal), solitary at each node, on mostly stout glabrous recurved pedicels which are much shorter than the leaves (2–7 mm. long); corolla white, rather large (3 mm. diam.), 4-parted, lobes acuminate; fruit glabrous, mature fruit not seen.

A well-defined form quite distinct from other western species. Specimens distributed by Mr. Howell were named *G. trifidum cuspidulatum* Gray. This species varies considerably in size, some plants being much more slender than the type.

Northern California.

California, Holder, no. 2580 (1863); Rattan, no. 544b (1866); Trinity Co., Rattan (1883); Siskyou Co., Howell, no. 137 (1886).

2. GALIUM TINCTORIUM L. Sp. Pl. 106. 1753.

DC. Prod. 4: 597. 1830. Torr. Fl. N. & Mid. States, 78. 1826. Pursh, Fl. Am. Sept. 102. 1814.

G. trifidum (in part) of American authors.

G. trifidum latifolium Torr. Fl. N. & Mid. States, 78. 1826.

G. obtusum Bigelow, Fl. Bost. ed. 2, 55. 1824.

Perennial, erect, 15–25 cm. high, usually rather stiff, much branched almost to the base, branches commonly solitary, strict (not irregularly diffuse), several times forked; stem 4-angled, glabrous or very nearly so; leaves commonly in 4's, linear to lanceolate (15–25 mm. long) broadest below the middle, obtuse, cuneate at the base, 1-nerved, margin and midrib slightly scabrous, dark-green and dull, not papillose; flowers terminal in clusters of 2–3, pedicels slender, not conspicuously divaricate even in fruit; corolla white, large (2–3½ mm. diam.), 4-parted, lobes oblong, acute; fruit smooth; endosperm spherical, hollow, annular in cross-section.

A form occurs along the coast and in Oswego, Co., N. Y., differing from the type in being more slender and weaker, leaves linear, inflorescence naked and larger flowered; perhaps distinct.

An examination of fresh material obtained at Ithaca, N. Y., shows that *G. tinctorium* differs also from all other species here treated except *G. asprellum* (*G. arcuatum*, *Brandegei*, *cymosum* and *asperrimum* not examined) in having a much larger disc at the base of the corolla.

Damp shady places and swamps: Canada to North Carolina and Tennessee, westward to Michigan, Nebraska, Indian Territory and Arizona.

Canada: Macoun, no. 77 (1877); Scott (1890); Holmes.
Massachusetts: Oakes.
New York: Petit; Sartwell; Torrey; Ouray (1834); Dudley.
New Jersey: Leggett (1868); Torrey.
North Carolina: Torr. Herb.
Tennessee: Bain, no. 294 (1893).
Kentucky: Short (1831); Peter (1893).
Illinois: Patterson.
Ohio: Kofoid (1891).
Michigan:
Minnesota: Ballard (1891).
Nebraska: Clements, no. 2554 (1895). In part.
Kansas: Norton, no. 204 (1895).
Arkansas: Harvey, no. 88.
Indian Territory: Bush, no. 1134 (1895).
Arizona: Palmer, no. 514 (1890).

GALIUM TINCTORIUM FILIFOLIUM n. var.

More slender than the type and often more diffuse; leaves almost filiform (2 mm. or less broad), not broader below the middle, strongly cellular papillose; inflorescence more open, pedicels slender, bracts minute; flowers in twos or threes, corolla larger.

Sandy places in swamps; Virginia to Florida along the coast.

Type in Herb. Cornell Univ; Bladen Co., N. C., Beadle no. 479 (1896).

Virginia: Curtiss (1855).
North Carolina: Schweinitz.
South Carolina: Hexamer and Maier (1855).
Georgia: no collector.
Florida: Rugel (1843).

GALIUM TINCTORIUM FLORIDANUM n. var.

A weak slender form decumbent at the base; leaves spatulate-linear, of medium size, flaccid; stem slightly hispid; flowers 4-parted (rarely in a few flowers 3-parted), on slender pedicels, occasionally axillary and solitary.

Florida.

Type in Herb. Cornell Univ.; Florida, Nash, no. 152 (1894); Pierce (1887); Curtiss, no. 4711 (1894); Straub, no. 104 (1895).

GALIUM TINCTORIUM LABRADORICUM n. var.

Low and strictly erect, 5–25 cm. high; branches few, ascending, mostly from the upper nodes; stem as in the type; leaves small (7–8 mm. long), linear, reflexed; flowers large.

In sphagnous bogs; Connecticut, New York and Wisconsin, northward to Labrador.

Type in Herb. Cornell Univ.; Oswego Co., N. Y., Rowlee and Wiegand (1895).

Connecticut: Torr. Herb.

New York: Torr. Herb.

Wisconsin: Lapham.

Lake Superior: Lorings.

Newfoundland: Waghorne (1893).

Labrador: Storer.

3. GALIUM BRANDEGEEI Gray, Proc. Amer. Acad. 12: 58. 1877.

Perennial and cespitose forming dense mats; stems low and prostate or ascending (5–12 cm. long), slender and rather densely leafy, smooth or nearly so; branches when present solitary; leaves in fours, unequal, obovate-spatulate, small (10 mm. or less), rounded at the apex, cuneate at the base, somewhat fleshy, dull on both surfaces, veins indistinct, margins and midrib glabrous; flowers lateral, commonly gemmate, on glabrous arcuate pedicels which are as long or longer than the leaves; corolla of medium size, white 3-parted, lobes broadly oval, obtuse; fruit glabrous, endosperm spherical, hollow, annular in cross-section.

This species is closely related to *G. trifidum subbiflorum*, but is distinguished by its peculiar matted habit, commonly glabrous stem, thicker leaves and stouter glabrous pedicels. In one of the Colorado plants the corolla shows a tendency to become 4-parted. Some California specimens have rough stems.

Northern New Mexico and Arizona to California and the Saskatchewan.

New Mexico: Brandegee (1875) type.

Arizona:

California: Lemmon, no. 1217 (1875); Bolander, no. 5025 (1866); Parish, no. 3320 (1894).

Colorado: Crandall, no. 281 (1894).

Wyoming: Nelson, no. 1763 (1895).

Saskatchewan: Macoun (1885).

4. GALIUM TRIFIDUM L. Sp. Pl. 105. 1753.

Fl. Dan. *pl. 48*. Wahl. Fl. Lap. 47. 1812. Roem. & Schul. Syst. Ledeb. Fl. Ross. Big. Fl. Bost. ed. 2, 56. 1824. DC. Prod. 4: 597. 1830.

G. trifidum pusillum Gray, Man. ed. 5, 209. 1867.

Perennial from slender rootstocks, very slender and weak, ascending, 40 cm. or less long, much branched and intertangled; stem sharply 4-angled, rough; branches commonly in twos; leaves in fours, linear-spatulate, 5–13 mm. long, obtuse, cuneate at the base, 1-nerved, dark-green and dull on both surfaces, scarcely papillose, margins and midrib retrorse-scabrous; flowers solitary on lateral or terminal pedicels which are capillary, scabrous and arcuate at the apex, much longer than the leaves, commonly two at each node or three terminal; corolla very small, white, ½ mm. long, trifid, lobes broadly oval, very obtuse; fruit glabrous; endosperm spherical and hollow, annular in cross-section.

Sphagnous bogs and cold swamps. Maine to southern New York, Ohio, Nebraska, Colorado and northward.

Maine: Fernald, no. 412 (1895); Parlin (1885).

Vermont: Grout and Eggleston (1894).

Central New York: Dudley and others; Britton (1886).

Ohio: Werner (1891).

Nebraska: Rydberg, no. 1418 (1893).

Michigan: Britton (1886).

Colorado: Wolf, no. 16–17 (1873).

GALIUM TRIFIDUM SUBBIFLORUM n. var.

Stems less scabrous than in the type, somewhat stouter; leaves larger, very unequal (8–10 mm. by 2 mm.), flaccid and nearly smooth; pedicels capillary and as long as the leaves, or sometimes rather stout; rarely two or even three-flowered, nearly glabrous.

This variety approaches *G. Claytoni* and *G. Brandegei*. The specimens examined are nearly all much discolored as if the leaves might be slightly fleshy.

Arizona and California to Oregon and the Saskatchewan.

Type in Herb Cornell Univ. Colorado, Hall and Harbour, no. 230 (1862).

Arizona: Palmer.

Utah: Watson, no. 485 (1869).

California: Kellogg (1866); Bolander, no. 5348 (1866); Parish. no. 1505 (1882); Eastwood (1894).

Oregon: Lyall (1858); Cronkhite (1864); Cusick no. 1397 (1886).

Colorado: Patterson (1892).

Wyoming: Nelson, no. 1115 (1894).

Saskatchewan: Bourgeau (1858).

GALIUM TRIFIDUM PACIFICUM n. var.

Larger and stouter than the type; leaves unequal, mostly in 4's, large and broadly oblong-spatulate, obtuse, cuneate at the base (15–23 mm. by 3–5 mm.), thin and flaccid; pedicels lateral, capillary, scabrous and arcuate as in the type, 1-flowered, equalling the leaves or shorter; corolla minute, 3-parted.

Some Washington specimens have nearly glabrous pedicels.

California to Washington.

Type in Herb. Cornell Univ.; Placer Co., Cal., Carpenter (1892), Bottom lands of the Columbia River, Suksdorf, no. 1661 (1893).

5. GALIUM CLAYTONI Michx. Fl. Bor. Am. 1: 78. 1803.

Roem. & Schul. Syst. Hooker, Fl. Bor. Am.

G. trifidum Pursh, Fl. Am. Sept. 103. 1814. Torr. Fl. N. & M. States, 78. 1826. Darl. Fl. Cest.

G. trifidum (in part) T. & G. Fl. N. A. 2: 22. 1841. DC. Prodr. 4: 597. 1830.

G. tinctorium Bigelow, Fl. Bost. ed. 2, 54. 1824.

Perennial; erect or ascending, becoming more diffuse when old, 15–60 cm. high; stem slender, or in some specimens quite stout, sharply 4-angled, more or less rough, the diffuse branches in 2's; leaves of medium size (8–15 mm. long), commonly in 5's or 6's, linear-spatulate or spatulate-oblong, obtuse, cuneately narrowed into a short petiole, rather firm in texture, scabrous on the margin and midrib, dark-green and dull above, not papillose, discolored in drying; flowers in clusters of 2's or 3's, terminal, provided with 1 or 2 minute bracts; pedicels straight, in fruit strongly divaricate, glabrous and rather stout; corolla minute, white, 3-parted, lobes broadly oval, obtuse; fruit glabrous; endosperm spherical and hollow, annular in cross-section.

This species, heretofore confounded with *G. trifidum*, embraces all the eastern forms with trifid corolla and scabrous stems not included under *G. trifidum*. Although somewhat variable, no varieties can be distinguished. It forms, however, a fairly well defined species. Its closest relative is *G. trifidum*, from which it differs in

its more robust habit, clustered terminal flowers and stouter glabrous pedicels. The southern Atlantic specimens have broader leaves and more slender pedicels than the type.

Swamps, Massachusetts and New York to North Carolina, Texas, Michigan and Nebraska.

Massachusetts: Boott (1853).

New York: Dudley and others.

Virginia: Small (1892); Heller (1893); Britton (1892).

North Carolina: Beardslee and Kofoid (1891); Torr. Herb.

Ohio: Sullivant.

Michigan: Farwell, no. 758 (1890).

Illinois: Eggert (1891).

Nebraska: Rydberg, no. 1840; Clements no. 2554 (1893). In part.

Texas: Reverchon (1876).

New Mexico: Wright, no. 1115 (1851).

6. GALIUM CYMOSUM n. sp.

Perennial; erect or ascending, 3–8 dm. high; stem 4-angled, more or less roughened, internodes long (4–6 cm.), diffusely branched, branches in 2's or 3's; leaves in 5's or 6's, linear, 10–17 mm. long, obtuse, thin, scabrous on the margin and midrib, scarcely papillose; flowers numerous, in terminal and lateral cymes; bracts foliaceous, small; pedicels short and slender, in flower mostly divaricate, in fruit strongly so; corolla white, large (2 mm. diam.), 3-parted, lobes triangular-ovate, obtuse; fruit glabrous; endosperm spherical and hollow, in cross-section annular.

Plant with an aspect intermediate between *G. Claytoni* and *G. asprellum*.

Oregon to British Columbia.

Type in Herb. Cornell Univ. Tacoma, Washington, J. B. Fleet (1896).

Oregon: Hall, no. 232 (1871).

British Columbia: Scouler.

7. GALIUM PALUSTRE L. Sp. Pl. 105. 1753.

Fl. Dan. *pl. 423*. *G. trifidum* (in part) and *G. tinctorium* (in part) of American authors.

? G. trifidum bifolium Macoun, Cat. Can. Plants, 202. 1884.

Perennial, erect and rather slender, about 40 cm. high; internodes very long (middle 6–7 cm. long), short branches mostly in

2's, stem sharply 4-angled, glabrous or slightly scabrous; leaves in typical specimens rather small, in 2's to 6's, linear-elliptic or spatulate, cuneate at the base, obtuse (7–10 mm. by 2–3 mm.), rather firm, margins and midrib slightly scabrous, not papillose, reduced to two at the upper nodes; flowers numerous in terminal and lateral cymes; bracteoles in the inflorescence minute; pedicels in flower ascending, 3–5 mm. long, in fruit strongly divaricate; corolla large, white (2½–3¼ mm. diam.), 4-parted, lobes oblong, acute; disk at the base almost obsolete; fruit glabrous; endosperm grooved on the inner face, in cross-section lunate.

Typically with small leaves and densely cymose inflorescence, but varying into large-leaved forms with few flowers, seemingly dependent upon the habitat. Many of these latter have most of the upper leaves in 2's, and although Prof. Macoun's type has not been seen, it seems probable that his var. *bifolium* is to be referred here. *G. palustre* grows mostly in patches, and late in the season creeping branches are sent out, forming dense green mats which remain green until covered by the snow. When in flower it is quite showy, the pure white patches being very conspicuous.

In damp shady or open places along roadsides and ditches, or in the margins of swamps. Newfoundland, Prince Edward's Island, and Canada to Massachusetts and New York.

Newfoundland: Robinson & Schrenk, no. 214 (1894).
Prince Edward's Island: Macoun (1888).
Canada, at Montreal, Macrae (1842).
Maine: Fernald (1891).
Massachusetts: Sears (1887).
Central New York: Dudley and others.

8. GALIUM CONCINNUM T. & G. Fl. N. A. 2: 23. 1841.

Endosperm deeply grooved.

Dry hillsides; Pennsylvania to Virginia, and westward to Minnesota, Iowa and Arkansas.

9. GALIUM ASPRELLUM Michx. Fl. Bor. Am. 1: 78. 1803.

DC. Prod. 4: 598. 1830. T. & G. Fl. N. A. 2: 23. 1841.
G. Pennsylvanicum Muhl. Cat.
G. spinulosum Raf. Prec. Decouv. 40. 1814.
G. micranthum Pursh, Fl. Am. Sept. 103. 1814. Except fruit.

Endosperm with a shallow groove.

Alluvial river banks and swamps; Newfoundland and Ontario to Pennsylvania and west to Wisconsin.

10. GALIUM ASPERRIMUM Gray, Mem. Amer. Acad. 4: 60. 1849. Bot. Calif. 1: 284. 1880.

G. asperrimum asperulum Gray, Bot. Calif. 1: 284. 1880.

Endosperm with a shallow groove. A variable species. The type and also other specimens from New Mexico and Arizona have small very scabrous leaves and a very large diffuse panicle. The type of variety *asperulum* Gr. (Watson, Nevada) is nearly glabrous with thinner leaves and few flowered inflorescence; other specimens from Washington, Oregon, California and Arizona have large and broad rather firm leaves. No distinct variety can be separated.

Washington to California, Utah, Arizona and New Mexico.

11. GALIUM TRIFLORUM Michx., Fl. Bor. Am. 1: 80. 1803.

Pursh, Fl. Am. Sept. 104. 1814. DC. Prod. 4: 601. 1830. Hooker, Fl. Bor. Am. T. & G. Fl. N. A. 2: 23. 1841.

G. cuspidatum Muhl. Cat.

G. brachiatum Pursh, Fl. Am. Sept. 103. 1814.

G. Pennsylvanicum Bart, Comp. Fl. Philad. 83.

Endosperm almost spherical, groove nearly obsolete. Specimens from Nebraska, New York, Connecticut and Massachusetts are more or less hirsute. The southern plants are somewhat smaller leaved, while some of the Pacific coast specimens have long slender pedicels (1½–4 cm.); others from Oregon and British Columbia have narrower leaves than the type.

Damp shady places; Labrador and Northern Canada to Florida and Louisiana, across the continent, south to northern California and Colorado.

CORNELL UNIVERSITY.

Two new Violets.

By Charles Louis Pollard.

Viola Porteriana n. sp.

Mature plant 2–3 dm. high, robust, acaulescent, from a stout branching rootstock; leaves long petioled, evidently exceeding the peduncles; blade glabrous or besprinkled with scattered hairs, in the early leaves cordate-oblong, obtuse, regularly but not prominently crenate; in the latter leaves deltoid-triangular, the base inclined to be cordate, obviously decurrent upon the petiole; apex obtuse or more often acute; margin ciliate, remotely and very irregularly crenate or dentate, the base sometimes with a few marked incisions; petiole pubescent below, 13–18 cm. long, the blade in the mature leaves 13 cm. long and 7 cm. wide at the base; flowers deep purple, as seen in a single withered specimen; cleistogamous flowers on ascending or erect peduncles; capsule obscurely 3-angled; seeds pale, not mottled nor pitted. (Plate 314.)

Type specimen collected in the vicinity of Bushkill Falls, Pennsylvania, May 31, 1897, by Mr. Joseph D. Crawford and the writer; additional specimens, in a later stage of development, were obtained by Mr. Crawford, July 15, near Hamburg, Pa. The species is dedicated to Professor Thomas C. Porter, who acted as guide on the very delightful Decoration Day excursion of the Torrey Club, and who was among the first to express an opinion of its distinctness. In fact there was substantial agreement among the botanists then present that the plant could not well be referred to any known species of the *sagittata* group, although the dried specimens may easily deceive those whose conceptions of *V. sagittata* and *V. cucullata* are of the elastic order. It may be distinguished from *V. ovata* Nutt., an abundance of which was collected on the same excursion, by its much greater size, absence of hirsute pubescence and the relative differences in the length of petioles and peduncles. From the true *V. sagittata* it may be known by the broadly triangular leaves, which are quite without the characteristic lobes and incisions of that species, and also by its habitat, which is dry sandy soil. Very probably it hybridizes or even intergrades with *V. ovata*, although I have never seen anything approaching it in the hundreds of ovata plants examined, including the typical specimens in the herbarium of the Philadelphia Academy of Sciences.

VIOLA FLAVOVIRENS n. sp.

Mature plant 2–3 dm. high, subcaulescent, from a slender rootstock; leaves of a yellowish-green hue, long-petioled, oblanceolate or oblong, very obtuse at apex, tapering at base, and decurrent upon the petiole; margins ciliate, remotely and obscurely denticulate; both surfaces of the blade, particularly along the veins, clothed with fine white hirsute pubescence, which is also prominent on both petioles and peduncles; flowers borne well above the leaves (peduncles 1–3 dm. long), bright yellow, faintly veined with purple, the lateral petals slightly bearded; diameter of flower 2½ cm.; sepals narrowly linear, finely ciliate; capsule not observed.

Types collected by A. A. Heller, at Lake Waha, Nez Perces County, Idaho, June 3d and 4th, 1896 (no. 3106), also by Messrs. Sandberg, Heller and MacDougal, at the same locality May 22, 1892 (no. 222). In both cases distributed as *V. Nuttallii*, a diminutive species to which it is scarcely at all related. Specimens collected by L. F. Henderson, at Julietta, Idaho, and by Howell, at Hood River, Oregon, 1880, are evidently referable also to *V. flavovirens*.

The Genus Oxytria of Rafinesque.

BY CHARLES LOUIS POLLARD.

There is a small genus of delicate Liliaceous plants in the South Atlantic and Gulf States, known in our manuals under the name of *Schoenolirion*, in which the synonymy is exceedingly confused, and the species have passed under a variety of generic appellations. Michaux established the name *Phalangium croceum** for a plant with "pyramidal raceme" and saffron yellow flowers, native of southern Georgia. As *Phalangium* Juss. is a synonym of *Anthericum* L., it was necessary to give the plant another generic appellation, and Elliott, having what he supposed to be Michaux's plant,† although the flowers were white, transferred the species to *Ornithogalum* with a question mark. (Bot. S. C. & Ga. 1: 397. 1821.) Rafinesque, in Fl. Tell. 2: 26, 1836, established two genera, *Oxytria* and *Amblostima*, basing the former on *Pha-*

* Fl. Bor. Amer. 1: 196. 1803.

† Dr. Gray has already made this point clear. See Amer. Nat. 10: 427. 1876.

langium croceum Nutt., not Michx., and the latter on *P. croceum* Michx. and *Ornithogalum croceum* of Elliott which he renamed *Amblostima albiflora*. Nuttall calls attention to the incorrectness of the term "pyramidal" as applied to the inflorescence, but in other respects his plant is that of Michaux, as Dr. Gray has already testified. Rafinesque's species are thus seen to be congeneric, and *Oxytria*, by priority of place, should stand as the designation for the genus, which was first named *Schoenolirion* by Durand (Proc. Acad. Nat. Sci. Philad. new series 3: 103, 1855). who obtained it from Torrey's manuscript of the Wheeler report. Durand here also published as *Schoenolirion album* the Californian plant afterward distinguished by Watson as *Hastingsia alba*.

Revising the genus *Schoenolirion* for the American Naturalist in 1876 (1. c. p. 427), Dr. Gray disregarded Rafinesque's *Amblostima albiflora*, taking up Dr. Feay's manuscript name of *S. Elliotti* for the plant with white flowers. He recognized in addition three species, *S. croceum*, *S. album* and *S. Texanum*, the latter being *Ornithogalum Texanum* of Scheele. The same treatment is observed by Watson in his treatment of the Liliaceae three years later. The arrangement of species will then stand as follows, excluding the Californian plant, which seems to be best kept generically distinct:

OXYTRIA Raf. Fl. Tell. 2: 26. 1836.

[SCHOENOLIRION Durand, Proc. Acad. Nat. Sci. Philad. (III) 4: 103, 1855, in part] and all later authors. Characters of the genus as defined by Watson, Proc. Amer. Acad. 14: 216. 1879.

1. O. CROCEA (Michx.) Raf. l. c.

Phalangium croceum Michx. Fl. Bor. Amer. 1: 196. 1803.
Schoenolirion croceum Gray, Amer. Nat. 10: 427. 1876.
Southern Georgia and Florida.

2. O. ALBIFLORA (Raf.)

Amblostima albiflora Raf. l. c.
Ornithogalum croceum Ell. Bot. S. C. & Ga. 1: 397. 1821.
Schoenolirion croceum Chapm. Fl. S. States, 483. 1863.
Schoenolirion Elliottii Feay; Gray. l. c.
Southern Georgia and Florida, probably also in Alabama.

3. O. TEXANA (Scheele)

Ornithogalum Texanum Scheele, Linnaea, 23: 146.
Schoenolirion Texanum Gray, l. c.
Texas and Louisiana.

Observations upon a Clearing in July.

BYRON D. HALSTED.

During the past winter a piece of woodland about four miles from New Brunswick, N. J., along the trolley line to South River has been chopped over, the wood removed and the brush left in large piles. No attempt has been made to clear the field of stumps or shrubs, and this piece offers a good opportunity for the study of the effect upon the smaller species of plants of the removal of the larger ones. The lot, of possibly five acres, somewhat irregular in outline, is quite uneven, and being in some parts high and in others low, with a small stream running through it, a large variety of conditions obtain and a rich flora results.

In general, it was an ordinary mid-Jersey forest of possibly the third cutting. Among the trees are oaks, chesnuts, and some pines in the higher ground, while near the bog, magnolias are present and birches and alders. In the lower part the *Rhus Vernix* and a tangle of *Smilax rotundifolia* line the wet portion where *Habenaria lacera* and *Osmunda cinnamomea* give place to the skunk cabbage.

The clearing was first visited in May with a class of a dozen students in quest of specimens for their plant collections. Upon this trip nothing unusual was noted, only the flowering herbs engaged the attention, and these were found upon the cleared lot, although in less abundance than in the woods, presumably only because the felling of the trees, and other tramping incident to the removal of the wood, had destroyed many of these tender humble plants.

A second visit was made upon July 5th, at the time when in the low ground an occasional *Azalea viscosa* was white with its highly fragrant blooms.

In the wooded portion the huckleberries of at least three species and the squaw berry, *Vaccinum stamineum*, abounded,

and were well laden with green half-grown berries. These shrubs were few in the cleared land, browned as if sun burned, while the scattered berries were ripening and some fully ready for the pickers. The remarkable reduction in the number of these Ericaceous shrubs might be largely due to the harsh treatment in connection with the removal of the trees, but there seemed to be unmistakable evidence that the specimens that had escaped the ravages of the woodman were suffering from the added exposure that the clearing of the trees had brought them.

Among the herbaceous plants none were more strikingly affected by the removal of the trees than the skunk cabbage. While in the shade of the trees the leaves were broad and green as in their wont to be, in the clearing the foliage had a yellow sickly cast with not more than half the size of the blades of the shaded plants. A long slender-leaved sedge neither in bloom nor fruit stopped short at the clearing as if cut down by a scythe. A sphagnum that had its usual vigor in the shade was brown and dry-topped in the sun, and gave unmistable signs of disliking tne new situation. In the clearing many of the oak sprouts were scalded at the tip. Ferns were much smaller in the sun than in the shade, and this was particularly true of *Osmunda cinnamomea* which in the shade spread out its great fronds into large "eagle nests," while those in the sun were nearly upright, and besides being dwarfed were browned as if in late autumn. The *Osmunda regalis* was found only in the shade.

On the other hand the grape vines, of a slender growth in the woods, run rampant over the large brush piles, due to the greater freedom as much perhaps as to the increased sunlight they now enjoy. The *Parthenocissus quinquefolia* behaved similar to its kind in the shade with a striking difference in the shorter petioles in the sunned plants.

Over all these five acres there was a striking absence of plants common to the open. At one point about two rods from a public road there were found two plants of *Bidens frondosa* and one small one of *Ambrosia artemisifolia.* A half-dozen solidagos not yet in bloom, probably *S. Canadensis* were taken. The only striking instance of open air vegetation was two small tufts of *Holcus lanatus* upon a knoll, where seed of this velvet grass got a foothold no one can tell how.

Nomenclatural Notes.

1. *Cheilanthes gracilis* (Fée) Metten. This specific name, adopted in the A. A. A. S. "Check-list," dates only from Fée's Genera Filicum, 1850–52, while the name *Cheilanthes gracilis* was applied by Kaulfuss (Enum. 209. 1824) to the *Pteris gracilis* of Michaux (*Pellaea gracilis* of Check-list, *Pellaea Stelleri* of Britton and Brown's Flora). Moore, to avoid producing a homonym of Kaulfuss' name, in transferring Fée's *Myriopteris gracilis* to *Cheilanthes*, called it *C. Feei*, which is the oldest available name for this species. *Cheilanthes lanuginosa* Nutt. was not published until the following year. The synonymy of this species thus stands as follows:

CHEILANTHES FEEI Moore, Ind. Fil. xxxviii. Mr. 1857.

Myriopteris gracilis Fée, Gen. Fil. 150. 1850–52.

Cheilanthes lanuginosa Nutt.; Hook. Sp. Fil. 2: 99. 1858.

Cheilanthes gracilis Metten. Abh. Senck. Nat. Gesell. 3: [reprint 36]. 1859. Not Kaulf. 1824.

2. *Epifagus* (*Epiphegus*) Nutt. This name is clearly antedated by *Leptamnium* Raf. Rafinesque's name was published in February, 1818. The date of publication of Nuttall's Genera is not exactly known, but it must have been later than the middle of May of that year. The title was deposited to secure copyright on April 3; the preface is dated May 27; and it is quite certain that the work was all issued at the same time. It is true that Barton, in his Compendium Florae Philadelphicae, published before the end of the same year (1818) repeatedly cites Nuttall's work, but in his preface he acknowledges Nuttall's kindness in permitting its use, and it is by no means certain which work was offered to the public first. In any event, it appears to me, the priority of Rafinesque's names, published in the January and February numbers of the *American Monthly Magazine*, is unquestionable. The synonymy of this monotypical genus is given here.

LEPTAMNIUM Raf. Am. Month. Mag. 2: 267. F. 1818.

[EPIFAGUS Nutt. Gen. 2: 60. 1818.]

LEPTAMNIUM VIRGINIANUM (L.) Raf.; A. Gr. Syn. Fl. 2: Part 1, 314. 1878. As syn.

Orobanche Virginiana L. Sp. Pl. 633. 1753.
Epifagus Americana Nutt. Gen. **2**: 60. 1818.
Epifagus Virginiana Bart. Comp. Fl. Philad. **2**: 50. 1818.

3. *Lepachys* Raf. In his paper published in the *Journal de Physique* in 1819, Rafinesque erected two species of *Rudbeckia* into new genera, under the names of *Ratibida* and *Lepachys*. Since that time nearly all writers have considered these two species distinct from *Rudbeckia*, yet congeneric, and the resulting genus has been known as *Obeliscaria* Cass. (a later name) or *Lepachys* Raf. It is indeed strange that no one appears to have noticed that, in the *Journal de Physique*, *Ratibida* is described before *Lepachys*. However, *Ratibida* has a better claim to priority than mere position, for it was duly published in the preceding year in the *American Monthly Magazine*. The synonymy of the entire genus, as now understood, is appended here.

RATIBIDA Raf. Am. Month. Mag. **2**: 268. 1818.

[LEPACHYS Raf. Journ. Phys. **89**: 100. 1819.]
[OBELISCARIA Cass. Dict. Sci. **35**: 372. 1825.]

RATIBIDA PINNATA (Vent.).

Rudbeckia pinnata Vent. Jard. Cels. *pl. 71*. 1800.
Lepachys pinnatifida Raf. Journ. Phys. **89**: 100. 1819.
Obeliscaria pinnata Cass. Dict. Sci. **35**: 373. 1825.
Lepachys pinnata Torr. & Gr. Fl. N. Am. **2**: 314. 1842.

RATIBIDA TAGETES (James).

Rudbeckia Tagetes James in Long's Exped. **2**: 353. 1823.
Rudbeckia globosa Nutt. Journ. Acad. Philad. **7**: 79. 1834.
Obeliscaria Tagetes DC. Prodr. **5**: 559. 1836.
Lepachys columnaris Tagetes A. Gr. Pl. Wright. **1**: 106. 1852.
Lepachys Tagetes A. Gr. Pac. R. R. Rep. **4**: 103. 1856.

RATIBIDA COLUMNARIS (Sims) D. Don; Sweet, Brit. Fl. Gard II. 361. 1838.

Rudbeckia columnaris Sims, Bot. Mag. *pl. 1601*. 1813.
Ratibida sulcata Raf. Journ. Phys. **89**: 100. 1819.
Obeliscaria columnaris DC. Prodr. **5**: 559. 1836.
Lepachys columnaris Torr. & Gr. Fl. N. Am. **2**: 315. 1842.

RATIBIDA PEDUNCULARIS (Torr. & Gr.)

Lepachys pedunculariis Torr. & Gr. Fl. N. Am. 2: 315. 1842.
Obeliscaria pedunculariis Walp. Repert. 2: 979. 1843.

4. *Balduina* (*Baldwinia*) Nutt. This name is a homonym of Rafinesque's *Baldwinia*, published a few months earlier in the American Monthly Magazine (2: 267. F. 1818). Elliot, retaining Nuttall's name *Balduina*, proposed to separate one of the two species as a separate genus, under the name *Actinospermum*, and this name must now be applied to both species if they are to be retained in the same genus, as is done in the synonymy given below. If the two species are held as constituting distinct genera, as is done by Torrey and Gray, Darby and Chapman (even in the last edition of his Flora, recently published), the name *Actinospermum* belongs to *A. angustifolium*, and the other species must receive a new generic appellation, in which case *Endorima* Raf. seems to be eligible, with *Balduina uniflora* Nutt. as its type, though the name was not properly published by Rafinesque. *Mnesiteon* Raf. (Fl. Ludov. 67. 1817) is given by the Kew Index as a synonym of *Baldwinia* Nutt., but it certainly is more than doubtful if this is correct. The only apparent ground for this view is that Rafinesque notes a resemblance between the type of his *Mnesiteon* and *Buphthalmum angustifolium* Pursh.

ACTINOSPERMUM Ell. Bot. S. C. & Ga. 2: 448. 1824.

[BALDUINA Nutt. Gen. 2: 175. 1818. Not *Baldwinia* Raf. F. 1818.]

[ENDORIMA Raf. Am. Month. Mag. 4: 195. Ja. 1819. Without synonymy or description.]

ACTINOSPERMUM UNIFLORUM (Nutt.)

Balduina uniflora Nutt. Gen. 2: 175. 1818.

ACTINOSPERMUM ANGUSTIFOLIUM (Pursh) Torr. & Gr. Fl. N. Am. 2: 389. 1842.

Buphthalmum angustifolium Pursh, Fl. Am. Sept. 564. 1814.
Balduina multiflora Nutt. Gen. 2: 176. 1818.

JOHN HENDLEY BARNHART.

TARRYTOWN ON-HUDSON, July, 1897.

Local Cryptogamic Notes.

By Henry C. Bennett and Smith Ely Jelliffe.

From observations made upon the local distribution of diatoms it would appear that *Amphipleura pellucida* is not a common diatom. Its occurrence in a recent gathering from Van Cortland Lake has prompted the following note upon other forms found in the same gathering. The following forms have been determined:

Amphipleura pellucida Kg.
Amphora ovalis Kg.
Cocconeis scutellum Ehr.
C. oblonga Kg.
Cymbella cistula Brun.
C. gastroides Kg.
C. leptoceros Kg.
Diatoma tenue Kg.
D. vulgare Bory.
Epithemia gibba Kg.
E. turgida Kg.
Eunotia lunaris Ehr.
E. monodon Ehr.
E. pectinalis Rab.
E. firma ?
E. tridentula Ehr.
Fragilaria construens (Ehr.) Grun.
F. capucina Demaz.
F. virescens Ralfs.
Gomphonema acuminatum Ehr.
G. capitatum Ehr.
G. constrictum Ehr.
G. cristatum Ralfs.
G. dichotomum Kg.
G. germinatum Ag.
Melosira granulata Ehr.
M. crenulata Kg.
M. scalaris Grun.
Meridion circulare Ag.
M. intermedium H L.S.
Navicula Anglica Ralfs.
N. ambigua Ehr.
N. cuspidata Kg.
N. gracilis Ehr.
N. rhyncocephala Kg.
N. spaerophora Kg.
N. viridis Kg.
Nitzschia scalaris Sm.
Odontidium hyemale Kg.
O. mutabile Sm.
Stauroneis punctata Kg.
S. phoenicenteron Ehr.
Surirella recedens A.S.
Synedra pulchella Kg.
S. radiata (Kg.) Grun.
S. ulna Ehr.
Tabellaria fenestrata Kg.
T. flocculosa Kg.

A number of forms from the same gathering are still under study. We hope to report these at the earliest opportunity.

New York, April, 1897.

Circular of the Sub-Commission of the Pan-American Medical Congress on Medicinal Flora of the United States.

SMITHSONIAN INSTITUTION.

Washington, D. C., July 1, 1897.

AMERICAN MEDICINAL FLORA.

DEAR SIR: The Smithsonian Institution has undertaken to bring together all possible material bearing on the medicinal uses of plants in the United States. Arrangements have been made with a body representing the Pan-American Medical Congress (the Sub-Commission on Medicinal Flora of the United States) to elaborate a report on this subject, and the material when received will be turned over to it for investigation.

The accompanying detailed instructions relative to specimens and notes have been prepared by the Sub-Commission.

All packages and correspondence should be addressed to the Smithsonian Institution, Washington, D. C., and marked on the outside *Medicinal Plants, for the U. S. National Museum.* Franks which will carry specimens, when of suitable size, together with descriptions and notes, free of postage through the mails, will be forwarded upon application. Should an object be too large for transmission by mail the sender is requested, before shipping it, to notify the Institution, in order that a proper authorization for its shipment may be made out.

Respectfully,

S. P. LANGLEY,
Secretary.

INSTRUCTIONS RELATIVE TO MEDICINAL PLANTS.

The Pan American Medical Congress, at its meeting held in the City of Mexico, in November, 1896, took steps to institute a systematic study of the American Medicinal Flora, through the medium of a General Commission and of special Sub-Commissions, the latter to be organized in the several countries. The Sub-Commission for the United States has been formed and consists of Dr. Valery Havard, U. S. A., chairman; Mr. Frederick V. Coville, Botanist of the U. S. Department of Agriculture; Dr. C. F. Millspaugh, Curator of the Botanical Department of the Field Columbian Museum, Chicago; Dr. Charles Mohr, State Botanist of Alabama; Dr. W. P. Wilson, Director of the Philadelphia Commercial Museums; and Professor H. H. Rusby, of the New York College of Pharmacy. This Sub-Commission solicits information con-

cerning the medicinal plants of the United States from every one in a position to accord it. The principal points of study are as follows:

1. Local names.
2. Local uses, together with historical facts.
3. Geographical distribution and degree of abundance in the wild state.
4. Is the plant collected for market, and if so,
   (a) At what season of the year?
   (b) To how great an extent?
   (c) How prepared for market?
   (d) What is the effect of such collection upon the wild supply?
   (e) What price does it bring?
   (f) Is the industry profitable?
5. Is the plant, or has it ever been, cultivated, and if so, give all information on the subject, particularly as to whether such supplies are of superior quality, and whether the industry has proved profitable.
6. If not cultivated, present facts concerning the life history of the plant which might aid in determining methods of cultivation.
7. Is the drug subjected to substitution or adulteration, and if so, give information as to the plants used for this purpose.

While it is not expected that many persons will be able to contribute information on all these points concerning any plant, it is hoped that a large number of persons will be willing to communicate such partial knowledge as they possess.

It is not the important or standard drugs alone concerning which information is sought. The Sub-Commission desires to compile a complete list of the plants which have been used medicinally, however trivial such use may be. It also desires to collect all obtainable information, historical, scientific and economic, concerning our native and naturalized plants of this class, and, to that end, invites the co-operation of all persons interested. Poisonous plants of all kinds come within the scope of our inquiry, whether producing dangerous symptoms in man, or simply skin inflammation, or, as "loco-weeds," deleterious to horses, cattle and sheep. In this respect the general reputation of a plant is not so much desired as the particulars of cases of poisoning actually seen, or heard from reliable observers. It is believed that much interesting knowledge can be obtained from Indians, Mexicans and half-breeds, and that, consequently, Indian agencies and reservations are particularly favorable fields for our investigation. Such knowledge will be most acceptable when based upon known facts or experiments.

In order to assist in the study of the habits, properties and uses of medicinal plants, the Sub-Commission undertakes to furnish the name of any plant-specimen received, together with any desired information available.

Owing to the diversity in the common names of many plants, it will be necessary for reports, when not furnished by botantists or others qualified to state the botanical names with certainty, to accompany the same with some specimen of the plant sufficient for its identification. While the Sub-Commission will endeavor to determine the plant from any portion of it which may be sent, it should be appreciated that the labor of identification is very greatly decreased, and its usefulness increased, by the possession of complete material, that is, leaf, flower and fruit, and in the case of small plants the underground portion also. It is best to dry such specimens thoroughly, in a flat con

dition under pressure, before mailing. While any convenient means for accomplishing this result may be employed, the following procedure is recommended: Select a flowering or fruiting branch, as the case may be, which, when passed, shall not exceed sixteen inches in length by ten inches in width. If the plant be an herb two or three feet high, it may be doubled to bring it within these measurements. If it possess root leaves, some of these should be included. Lay the specimen flat in a fold of newspaper and place this in a pile of newspapers, carpet felting, or some other form of paper which readily absorbs moisture, and place the pile in a dry place under a pressure of about twenty to thirty pounds, sufficient to keep the leaves from wrinkling as they dry. If a number of specimens are pressed at the same time, each is to be separated from the other by three or four folded newspapers or an equivalent in other kinds of paper.

In twelve to twenty-four hours these papers will be found saturated with the absorbed moisture and the fold containing the specimen should be transferred to dry ones. This change should be repeated in from two to five days, according to the state of the weather, the place where the drying is done, the fleshiness of the specimens, etc. The best way to secure the desired pressure is by means of a pair of strong straps, though weights will do. The best place for drying is beside a hot kitchen range. When dry the specimens should be mailed between cardboards or some other light but stiff materials which will not bend in transit.

It is a most important matter that the name and address of the sender should be attached to the package and that the specimens, if more than one, should be numbered, the sender retaining also specimens bearing the same number, to facilitate any correspondence which may follow. The Sub-Commission requests that, so far as practicable, all plants sent be represented by at least four specimens.

H. H. RUSBY. M. D.,
Chairman of the General Commission.
NEW YORK COLLEGE OF PHARMACY.

VALERY HAVARD, M. D.
Chairman of the Sub-Commission.
FORT SLOCUM, DAVIDS ISLAND, NEW YORK.

Reviews.

Nomenclaturregeln für die Beamten des Königlichen Botanischen Gartens und Museums zu Berlin. (Notizblatt. Konigl. Bot. Gart. 1: 245–250. 6 Je. 1897.)

The staff of the Royal Botanical Garden and Museum of Berlin have framed a set of rules for their guidance in nomenclature, and orthography of names, of which the following is a translation with annotations:

1. The principle of priority in the choice of names of genera

and species of plants is, in general, firmly maintained; the beginning of the establishment of priority is considered to be 1753–54.*

2. A generic name will, however, be allowed to fall, if it has not been in general use during fifty years from the date of its establishment. But if the name has been taken up in the elaboration of monographs, or in large floras, in following the "Laws of nomenclature of the year 1868," it shall remain in use by us.†

3. In order to obtain unity of form in the designations of groups of the vegetable kingdom, we will employ terminations as follows: The orders (Reihen) in *ales*, the families in *aceae*, the subfamilies in *oideae*, the tribes in *eae*, the subtribes in *inae*; the terminations being appended to the root of the typical genus, thus Pandan(us)-ales; Rumex, Rumic(is)-oideae; Asclepias, Asclepiad-(is)-eae; Metastelma, Metastelmat(is)-inae; Madi(a)-inae. (Some exceptions, as Coniferae, Cruciferae, Umbelliferae, Palmae, etc., remain correct.)‡

4. Relative to the gender of generic names, we are guided, in the case of classical designations, by correct grammatical custom

* Priority of publication is to be regarded as the fundamental principle of botanical nomenclature. (Canon I, Rochester Code.)

The botanical nomenclature of both genera and species is to begin with the publication of the first edition of Linnaeus's "Species Plantarum" in 1753. (Canon II, Rochester Code.)

The German procedure thus agrees with the American, except in the double date 1753–54; the advantage of the double date is certainly questionable, as it fixes no definite point of departure, and would lead to different interpretations and consequent nonuniformity. On the other hand, the selection of the first edition of Linnaeus' "Species Plantarum" as the starting point permits no uncertainty.

† The application of the ideas embodied in this paragraph would lead to great uncertainty in very many cases, and we do not believe that the Berlin botanists will long maintain them. How they can consistently decide on what is "general use," as compared with what we may term "special use," is more than we can imagine; and who is to determine what descriptive volume is a "monograph" or what flora a "large" one is equally difficult to understand; and how are they to determine in many cases, whether the author has or has not followed the Paris code of 1868? Or will calling a brochure a 'monograph" make it one? But it is to be remembered that these rules have been framed for the special use of the Berlin botanists, and we shall be interested in observing the results.

‡ This is, we believe, the first serious attempt to unify group nomenclature, and we heartily approve it. That anything is to be gained in the end by admitting exceptions may be questioned.

as to later names and barbarisms we follow the "Natürlichen Pflanzenfamilien." Alterations in endings or in the word itself are not, as a rule, approved. Notorious errors in those derived from personal names must, however, be removed; for example, *Rülingia* is to be written in place of *Rulingia* as used by the English and imported by us.*

5. Generic names, which have been remanded to synonymy are better not used again in an altered sense to designate a new genus, or a section, etc.†

6. Priority is to determine the choice of specific names, unless objections to their maintenance have been made in a monograph. If a species is transferred to another genus it must there retain its oldest specific name.‡

7. The author who first named the species even if under another genus must always remain knowable, and to this end his name (Zeichen = sign) is to be placed in a parenthesis before the name of the author who has effected its transfer to the new genus, thus *Pulsatilla pratensis* (L.) Mill = *Anemone pratensis* L. In case the author of a species has himself later transferred it to another genus the parenthesis will be omitted. (In continued works where the parenthesis has not been employed, this rule need not be followed.)§

8. As regards the methods of writing names of species the

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* "Notorious errors" are likely to be variously understood.

† The publication of a generic name or a binomial invalidates the use of the same name for any subsequently published genus or species respectively. (Canon IV, Rochester Code.)

In the rejection of generic homonyms the German rule is not as definite and exact as the American, and is thus the more likely to be inconsistently employed and variously understood. The German rules do not definitely refer to specific homomyms, though from the practice of some of the subscribers to them we infer that the matter is in mind.

‡ In the transfer of a species to a genus other than the one under which it was first published the original specific name is to be retained. (Canon III., Rochester Code, as amended at Madison.)

The German and American principles here agree, save the exception of objections made in "monographs." How many descriptions or how many pages constitute a "monograph?"

§ In the case of a species which has been transferred from one genus to another, the original author must always be cited in parenthesis, followed by the author of the new binomial. (Canon VIII., Rochester Code.)

practice of Linnaeus has been introduced into the Botanical Garden and Museum. This will still be maintained, and we therefore write all specific names with a small initial letter, except those derived from personal names and those which are substantives (generic names still or formerly in use); for example, *Ficus indica*, *Circaea lutetiana*, *Brassica Napus*, *Solanum Dulcamara*, *Lythrum Hyssopifolia*, *Isachne Buttneri*, *Sabicea Henningsiana*.*

9. When generic or specific names are formed from proper names we add the letter *a* for the genus to such names ending in a vowel or in *r*, and *i* for the species, thus *Glazioua* (from Glaziou), *Bureaua* (from Bureau), *Schützea* (from Schütze), *Kernera* (from Kerner), also *Glazioui*, *Bureaui*, *Schützei*, *Kerneri*; if the name ends in *a* we change this vowel for euphony to *ae*, thus from Colla, *Collaea*; in all other cases we add *ia* or *ii* to the name, thus *Schützia* (from Schütz), *Schützii*, etc. This applies as well to names terminating in *us*, thus *Magnusia*, *Magnusii* (not *Magni*), *Hieronymusia*, *Hieronymusii* (not *Hieronymi*); the adjective forms of proper names are formed in a corresponding manner, thus *Schützeana*, *Schütziana*, *Magnusiana*. To make a difference in the application of the genitive and adjective forms is not practicable at the present time.†

10. In forming compound Latin or Greek substantives or adjectives the connecting vowel between the roots is to be written *i* in Latin, *o* in Greek; we thus write *menthifolia*, not *menthaefolia*.‡

11. We recommend the avoidance of such combinations of names as produce tautology, as *Linaria Linaria* or *Elvasia elvasioides*; it is permitted to deviate from priority in the cases of such names which have arisen from gross geographical errors by the author, as, for example, *Asclepias syriaca* L. (which originated in

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* Specific or varietal names derived from persons or places, or used as the genitive of generic names or substantives, are to be printed with a capital initial letter. (Committee on Nomenclature, Botanical Club, A. A. A. S.)

The American rule calls for wider capitalization than the German. The matter is of little consequence as regards nomenclature; the increasing tendency to decapitalize all specific names seems to us, however, unfortunate.

† We infer from this that specific names such as *Schützei* and *Schützeana* would not be maintained in the same genus, and this is highly desirable.

‡ This will, we think, be generally approved.

the United States), *Leptopetalum mexicanum* Hook. & Arn. (from the Liu-kiu Islands).*

12. Hybrids are indicated by connecting the names of the parents by ×, the alphabetical order of the specific names being preserved, thus *Cirsium palustre* × *rivulare*. In the position of the names, no difference is made as to which is "father" and which "mother." We do not favor the binary nomenclature for hybrids.†

13. Manuscript names have under no circumstances a right of maintainance, even if they appear on printed labels of exsiccatae. This is also true of gardener's names and those of trade catalogues. The recognition of the species requires a printed description, which may, however, appear on an exsiccata label.‡

14. An author has no right to change a generic or specific name once given, except for very important reasons, such as those cited in rule no. 11.§

It is very interesting to remark how nearly, after long-continued discussion, the Berlin botanists have approximated the principles of the Rochester code. In fact, their rules for guidance include practically all the principles enunciated by the American botanists and zoölogists, and differ from them mainly in admitting exceptions; we believe that they will find in practice that the exceptions will give them more trouble than if they had not been allowed, and we confidently look to their abandonment.

N. L. B.

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* As to "duplicate binomials" (as *Catalpa Catalpa*), the German rule is put in the form of a recommendation, not as a fixed principle, and it may be remarked that they have been used by several of the monographers of the "Natürlichen Pflanzenfamilien." The fact of their being tautological does not seem to us to be a good reason for abandoning them, and in such names as *Elvasia elvasioides*, who is to determine whether they are tautological or not? Again, the rejection of supposed or certainly misleading geographical names is open to many objections. A number of species bearing the names, *Canadense*, *Pennsylvanicum*, *Missouriense* do not occur in the Canada, Pennsylvania or Missouri of to-day, owing to changes of territorial extent. It would be as well to reject the name *Dioscorea villosa*, for example, because the plant is not villous, and there are many such cases. The recommendations are not conducive to uniform practice.

† We think this will meet with general approval.

‡ Publication of a species consists only (1) in the distribution of a printed description of the species named; (2) in the publishing of a binomial, with reference to a previously published species as a type (Canon II, Rochester Code).

§ Here again we note an unfortunate indefiniteness which is not conducive to stability.

A Text Book of General Lichenology. With descriptions and figures of the Genera occurring in the Northeastern United States. By Albert Schneider, M.S., M.D. Willard N. Clute & Co., Binghamton, N. Y. 1897.

There has been a demand for years for a text book on lichens and, though valuable contributions have been made from time to time, there has been no complete or general work. In Tuckerman's life-work we have a classic guide for the learned; but even the experts admit that the technical difficulties of the "General Synopsis" defeat its end, for the amateur student at least.

The well printed and copiously illustrated volume on the subject with Dr. Schneider has just brought out is far from popular, but it is clear, terse and to the point, and will prove a practical working hand book for those botanists or amateurs that desire to take up the study of these plants.

The historical sketch of the development of the study of lichenology is the best, we believe, that is to be obtained in English. From it one gathers a fair conception of the battles of hypotheses fought in the European laboratories for the past hundred years or so, and comes away with a clear idea of the most modern views upon symbiosis and the morphology and physiology of the lichens.

With reference to the author's idea that the spores are not reproductive organs, we fail to see that his arguments win his point; for the reason that a lichen spore does not develop a lichen is that it does not find a suitable host. In laboratory work characteristic growths of other forms of parasitic life cannot be obtained for similar reasons.

The teachings of Reinke are strong in the systematic part of the work, and due attention has been given to the algae.

The illustrations have been well drawn and, though somewhat schematic, are a valuable addition to the volume, which is in so many ways to be recommended as a practical text book.

S. E. J.

Proceedings of the Botanical Club, A. A. A. S.--Detroit Meeting, August, 1897.

TUESDAY, AUGUST 10TH.

In the absence of all officers elected at the last meeting, the Club organized by the election of Dr. J. J. Davis, President, and Mr. A. F. Woods, Secretary.

Professor C. E. Bessey described an extensive epidemic of *Erysiphe communis* on *Polygonum aviculare* about Lincoln, Neb. In the ensuing discussion the same occurrence was reported from Michigan and Wisconsin.

Professor Bessey also described a phosphorescent mosquito (*Chironomus* sp.).

Professor Beal exhibited a number of photographs of the Botanical Garden of the Michigan Agricultural College; also charts of fungi and mounted sheets of weeds for lecture-room purposes.

WEDNESDAY, AUGUST 11TH.

Mr. Rodney H. True presented "Notes on the Genus *Dicranum*."

Dicranum spurium in America consists of two forms, the genuine species and a form differing in many important characteristics from any described; the latter has probably a wide distribution in eastern America. *Dicranum rhabdocarpum* in abundant fruit has been found on Pikes Peak by Professor J. M. Holzinger. Its affinities ally it closely with *D. Bonjeani* DeNot. and not, as stated in the L. & J. Manual, with *D. Mühlenbeckii*. Mr. A. J. Grout has collected, probably for the first time in America, *Dicranum longifolium* var. *subalpinum* on Mt. Mansfield, Vt.

Dr. C. E. Bessey spoke on sensitive stamens in *Opuntia fragilis*; in bright sunlight they were very noticeable, quite as much so as in *Portulaca*, and were subsequently observed in another species. Dr. Britton remarked on similar sensitiveness in the stamens of the eastern *Opuntia Opuntia*.

Professor C. F. Wheeler remarked on two interesting species of oaks, discovered by Mr. S. L. Alexander in the vicinity of Birmingham, Mich., deferring critical determination of the species.

Remarks were made by Professor Britton, Mr. Alexander and Mr. Moseley.

Mr. Albert F. Woods presented a note on a method of preserving the green color of plant tissues especially to show contrasts between green tissues and those of other colors. The method is briefly to soak the material in a dilute glycerine solution containing a little copper sulphate for several days or weeks, then, after washing out the extra copper, mount the material in glycerine gelatine hardened with formalin.

THURSDAY, AUGUST 12TH.

The President appointed a committee to nominate officers for the ensuing meeting, and on the report of the committee the foling were unanimously elected: President, Professor Conway MacMillan; Vice-President, Professor C. B. Waldron; Secretary, Mr. A. B. Seymour.

Professor A. D. Selby noted winter injury of plum and peach trees in Ohio during the past winter. Plum trees that had been defoliated in summer by *Cylindrosporium Padi* were severely damaged by freezing; more than 75 per cent. of three-year-old trees of certain varieties were killed to the snow line; eight-year-old trees had the bark separated from the trunk, chiefly on the south and west sides.

Professor Selby also remarked that leaves of *Ailanthus* dropped prematurely in June during and following the severe hot weather. Angular areas became discolored and subsequently dropped out. No parasite was found. It appeared referable to secondary effects of insect puncture.

Professor V. M. Spaulding spoke of the formation of a botanical garden at the University of Michigan at Ann Arbor, on the campus, where some 300 herbaceous species are now in cultivation.

Dr. Rodney H. True discussed the causes of the nodding of moss capsules.

Preliminary experiments directed toward determining the causes and directive influences controlling the nodding of capsules showed that in *Minum cuspidatum* the weight of the capsule has no noticeable influence. The curvature seems to be a response to

gravitation, and the direction of the plane in which the capsule falls is determined by the direction of strongest illumination, the capsule falling toward such source of illumination.

The Club then adjourned to meet next year with the Association as usual.

Botanical Notes.

The Plant World, an illustrated monthly Journal of Popular Botany. The first number of this new serial will be issued October 1, 1897. It will be a 16-page octavo, and will occupy an intermediate position between the technical botanical journals and the smaller amateur publications. It will present the facts of plant life in simple, popular language, and aim to interest those who desire acquaintance with plants and their life history, but who have no inclination for a systematic course of study. The editorial staff is as follows: Editor-in-chief, F. H. Knowlton, Ph.D., U. S. National Museum, Washington, D. C.; associates, Mr. Charles Louis Pollard, Miss Clara E. Cummings, Mr. Walter Hough, Mrs. N. L. Britton, Miss Josephine E. Tilden, Mr. A. W. Evans. The subscription price is $1.00 a year. The publishers are Willard N. Clute & Co., Binghampton, N. Y.

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